IN THIS ISSUE: Electrical Trade in Countries Bordering the Pacific

JOURNAL OF ELECTRICITY

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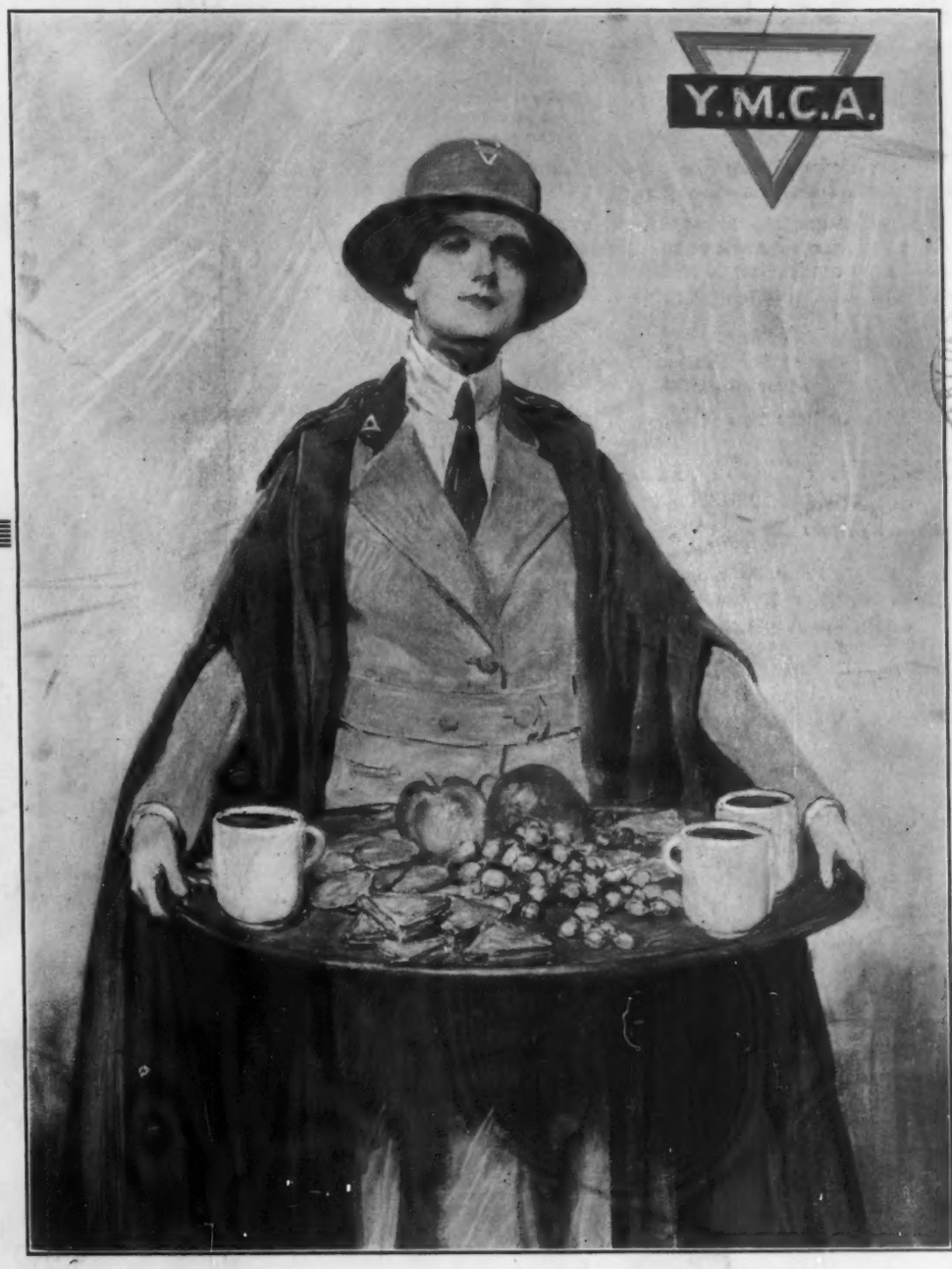

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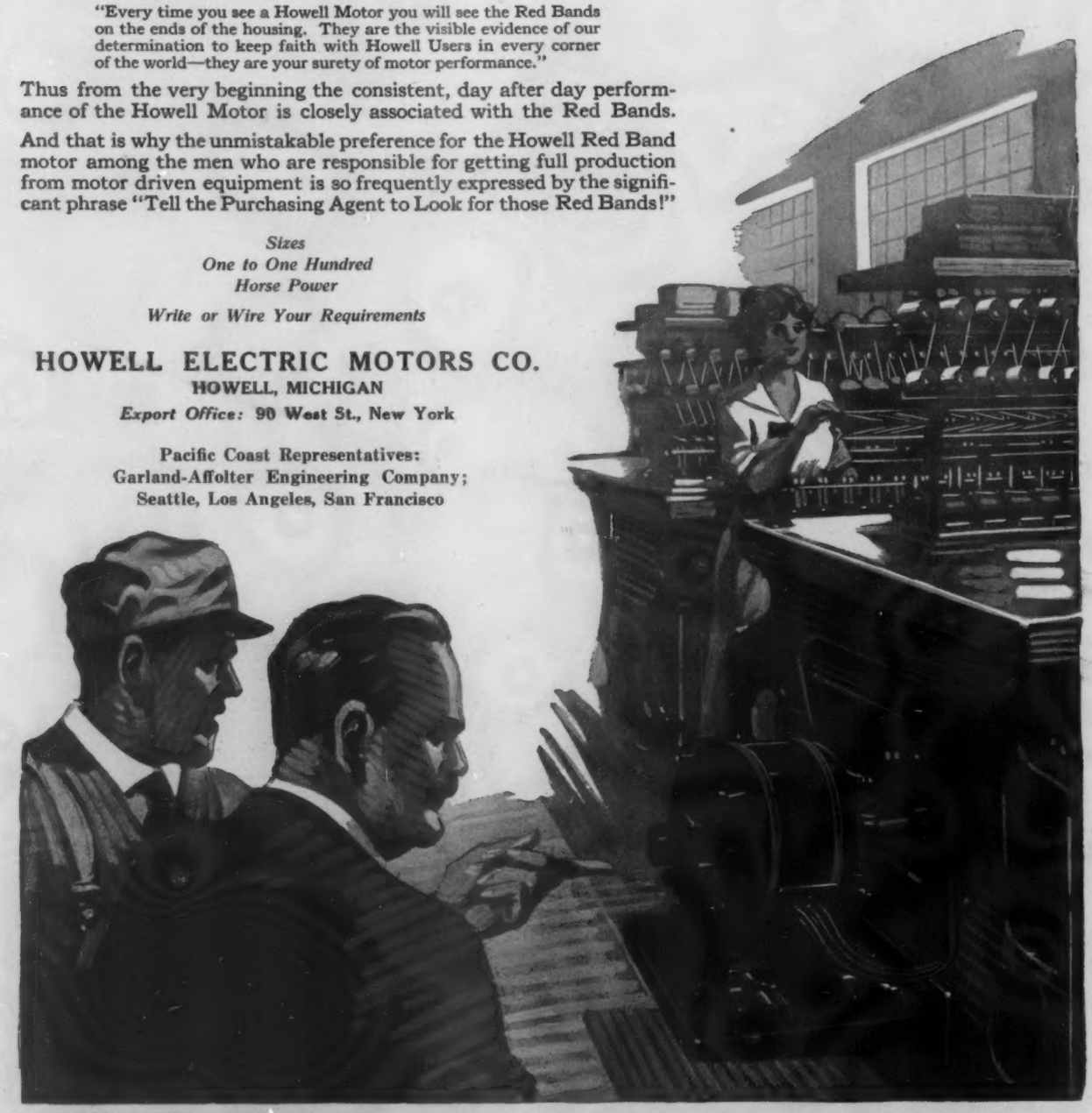

HOWELL RED BAND ELECTRIC **MOTORS**

JOURNAL OF ELECTRICITY

FOUNDED 1887

ROBERT SIBLEY, Editor — CLOTILDE GRUNSKY, Associate

VOLUME 43 — SAN FRANCISCO, AUGUST 15, 1919 — NUMBER 4

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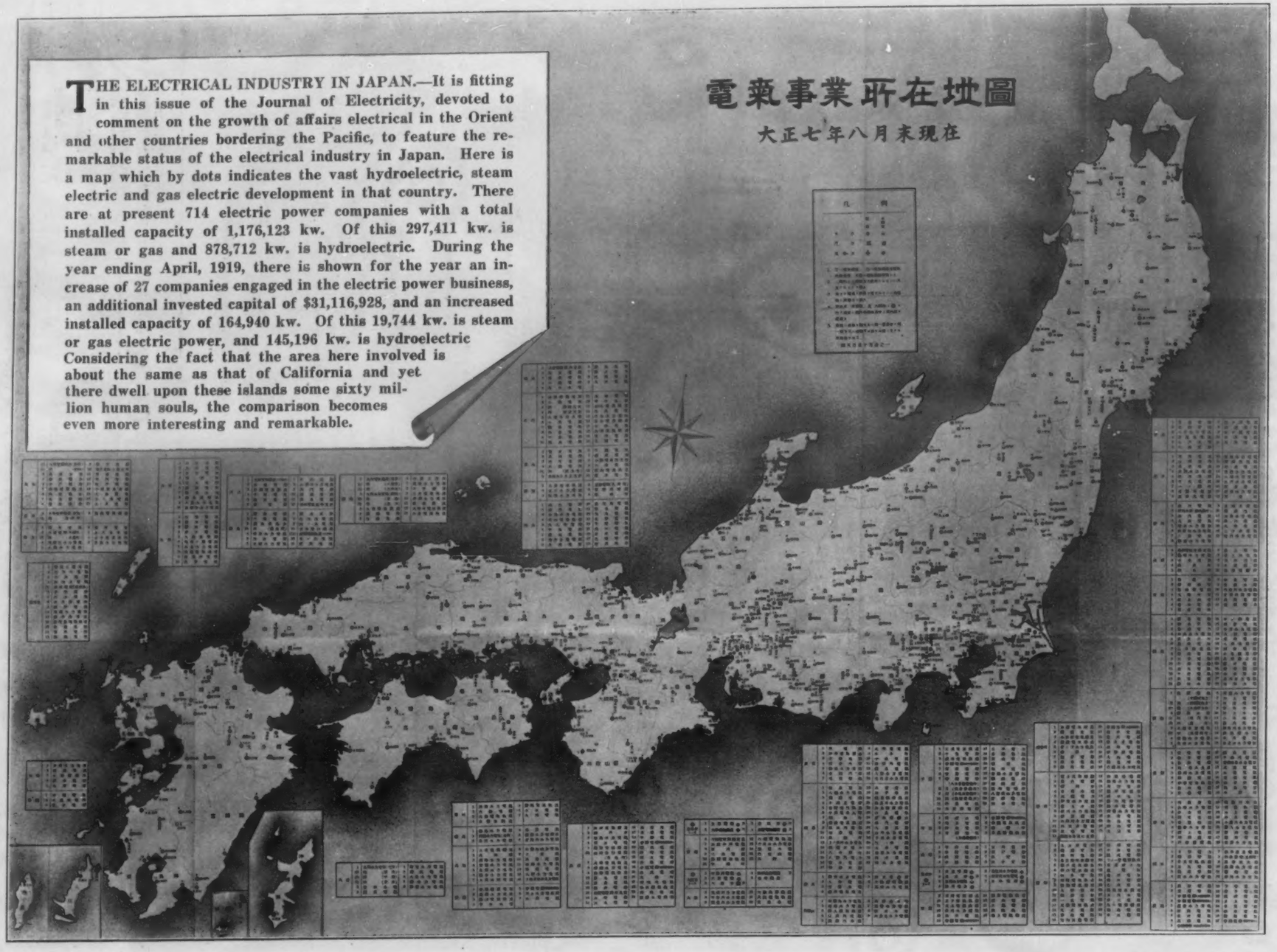
THE ELECTRICAL INDUSTRY IN JAPAN.—It is fitting in this issue of the Journal of Electricity, devoted to comment on the growth of affairs electrical in the Orient and other countries bordering the Pacific, to feature the remarkable status of the electrical industry in Japan. Here is a map which by dots indicates the vast hydroelectric, steam electric and gas electric development in that country. There are at present 714 electric power companies with a total installed capacity of 1,176,123 kw. Of this 297,411 kw. is steam or gas and 878,712 kw. is hydroelectric. During the year ending April, 1919, there is shown for the year an increase of 27 companies engaged in the electric power business, an additional invested capital of $31,116,928, and an increased installed capacity of 164,940 kw. Of this 19,744 kw. is steam or gas electric power, and 145,196 kw. is hydroelectric Considering the fact that the area here involved is about the same as that of California and yet there dwell upon these islands some sixty million human souls, the comparison becomes even more interesting and remarkable.



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JOURNAL OF ELECTRICITY

DEVOTED TO THE UPBUILDING OF THE ELECTRICAL INDUSTRY IN THE WEST AND IN THE COUNTRIES BORDERING THE GREAT PACIFIC

Volume 43 SAN FRANCISCO, AUGUST 15, 1919 Number 4

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NO PERSON, GROUP OF PERSONS, OR NATION may think for one instant that anything underhanded, which may have slipped into the Treaty of Peace at Paris, either intentionally or unintentionally, will enable anyone to deal unrighteously or to advantage over other nations. The crowning triumph of the world war is found in the fact that an awakened consciousness now watches the actions of individuals and nations the world over, and woe to him who would attempt to bully a weaker nation or in any respect throttle the democracy of free peoples.

The Contractor-Dealers at Milwaukee

The West has been unusually interested in the crystallizing of the Bureau of Education and Research idea at the recent convention of the National Association of Electrical Contractors and Dealers at Milwaukee, as outlined in the editorial column of the Journal of Electricity June 15, 1919.

The work of the California Electrical Cooperative Campaign has already demonstrated the beneficial results of work of this sort. Sincerity of purpose, willingness to enter into broad constructive work, and a desire to grow away from the hermit idea in business method are fundamentals prerequisite for work of this nature. In proportion to the unadulterated injection of these ideals into the national movement will it find reward for the necessarily large sums of money to be expended. The Journal of Electricity believes that the broad vision of men such as that of W. L. Goodwin and W. H. Morton, who are today sponsoring this movement, merits the full cooperation of the industry.

Generally speaking, the movement met with unanimous endorsement. The main discussion concerned itself with the methods to be employed in carrying out the idea and to ways and means to be used in raising the necessary funds required in financing the undertaking.

Briefly summarizing the outcome of the discussion, the final decision was that the committee representing the manufacturers agreed to provide the national funds for carrying out the national work as previously outlined, with the understanding that the jobbers, central stations, and contractor-dealers would provide funds for the local cooperative work initiated by the National Association.

There is always promising work to be undertaken in a nation-wide movement such as this and this gives an opportunity to the manufacturer to benefit on national work done in behalf of improving trade conditions while the central station, jobber and contractor-dealer are, as they should be, allowed to confine their activities to the local field where contact with and knowledge of local situations are of vital importance.

Cost of Electric Power in Japan

Statistics recently compiled by the Ministry of Communication of Japan, as given out by Professor Gitaro Yamakawa of the electrical engineering department of the Tokyo Imperial University, who is now visiting this country, are very interesting.

In the matter of erection of water power, steam power and gas power plants, the statistics are listed under four headings. The cost includes power station lines and distribution circuits for consumers, as follows:

Station capacity in kilowatts	0-500	500-2500	2500-5000	Over 5000
Water power	$438.50	$306.50	$246.50	$153.50
Steam "	481.50	356.00		331.50
Gas "	503.50			

It will be noted that the average cost of power per kw. of installed capacity is slightly over one hundred and fifty dollars for installations above 5000 kw. This would seem to be remarkably cheap as compared with American installations where power lines and distribution systems are included.

Coming now to a consideration of average operating expenses, we have the following costs per kw-hr., inclusive of fuel, repair, oils, wastes, salaries and wages:

Station capacity in kilowatts	0-500	500-2500	2500-5000	Over 5000
Water	$0.0244	$0.0129	$0.0025	$0.0024
Steam	0.0348	0.0193		0.0130
Gas	0.0468			

One of the remarkable comparisons in this statement is to be found in the fourth column, where water power and steam generation costs are given for installations above 5000 kw.

Interconnection on a vast scale seems to be well under way at the present time and this will unquestionably reduce generating costs to lower figures and at the same time mean much for conservation of power and continuity of service. From Osaka, the great industrial center of Japan, on up to the north for a distance of two hundred and ten miles, an interconnected system is now being perfected that will tie in 90,000 kw. of installed capacity feeding into a trunk line of 125,000 volts. Electrification of railroads, too, will still further assist in interconnection. A private corporation is now applying for a

governmental franchise to construct a high speed electric railway from Tokyo to Osaka, a distance of two hundred and forty miles.

Taken as a whole, the situation in the electrical industry is in a very active state at present and many new triumphs in electrical engineering in Japan will undoubtedly result in early months ahead.

The Possibilities of Russian Trade

The vast population of Russia with its growing ambition, though thwarted, of life on a higher level of comfort, and with its destitute condition as regards manufactured products, offers a most stupendous market for electrical products. A commercial representative of the Soviet Republic in this country appeals for a prompt renewal of trade with that country on the basis of a crying need, among other necessities, for electrical machinery, appliances and implements of all kinds. An American-Russian Chamber of Commerce representing the Kolchak government, with a more official recognition from American commercial interests, offers to furnish lists of reliable merchants in Russia, the articles most needed and what the Russians have to offer in exchange.

It is obvious, however, that with the political and financial uncertainties of the present Russian situation, a merchant must have guarantees, both of the safety of his goods and the value of the exchange he receives for them. The Canadian commission, whose findings are noted elsewhere in this issue, suggests a basis of barter as the only practical method of trade under present conditions. Great Britain has taken measures to aid in the reestablishing of Russian trade under government guarantee. The War Risks Insurance Office of the Board of Trade will now insure British goods in Russia and Russian goods bought by British houses for export against loss or damage arising from war risks, riots, civil commotions, etc. Facilities for marine insurance will also be given where this cannot be obtained through the ordinary channels. At present, according to the American Chamber of Commerce in London, the British government scheme covers only southeastern Russia and the northern Caucasus, although trade with the Allied zone in Siberia is also encouraged. This area, however, may be extended or varied as is found expedient in future.

American trade with Russia will undoubtedly for some time be confined to Siberia and the territory under Allied control. This is fed almost entirely through Vladivostok, and offers an unrivaled opportunity to Pacific Coast trade which will dare the difficulties to reap the harvest offered by a rich country starved of necessities.

The European Coal Shortage

So important a part has coal played in commercial and military supremacy, that the commercial standing of the great nations may in large measure be traced to their strategic positions in possession of the world's fuel.

The present alarming coal shortage of Europe not only has its electrical significance in the stimulus it offers to prompt and general water power develment, but has a special bearing on the commercial relationships of the United States, its growing merchant marine and its foreign trade.

Western and southern Europe is badly in need of coal. The deficiencies in the several countries have heretofore been supplied by Great Britain, who, owing to labor troubles and the increasing costs of mining her depleted stores, finds her coal production greatly reduced. It is today possible for American coal to be sold in England at a considerably lower figure than the English mined product. According to a recent statement in the London Times, the output for the year beginning July 16 next will be about 70 million tons less than that of 1913.

The total British exports in 1913 were 77 million tons. If the restrictions in the consumption of coal are removed on the basis of internal consumption of 1913, this would leave but seven million tons for export. As France, Italy, Sweden, Norway, and Spain have largely been dependent on Great Britain for fuel, it can be realized that the situation is a serious one apart from England's loss of practically its only raw product export. Considering the fact that France's normal output has been reduced some 41 million tons through obstruction of mines by the enemy and that Belgian production has been reduced through labor troubles, although the mines were not destroyed as is commonly supposed, the difficulty is the more apparent. Italy is in a desperate situation as regards fuel—and the need for this coming winter will be great throughout northern Europe. On a pre-war basis of consumption the following tabular statement gives the deficiency in the various countries in Western and Northern Europe which must be met by imports:

	Long tons (2240 lbs.)
France	20,000,000
Spain	3,650,000
Italy	9,650,000
Holland (other than supplies from Germany)	2,010,000
Sweden	4,560,000
Portugal	1,360,000
Norway	2,300,000
Mediterranean countries (other than Italy)	3,500,000
Denmark	3,030,000
Total	50,060,000

It is obvious that most of this must come from the United States, and it is also obvious that a great impetus in hydroelectric development must be felt the world over to meet the appalling deficit in the world's fuel resources.

The Nominating Committee

There is always some dissatisfaction over the composition of nominating committees appointed to name the incoming officers for important engineering and technical societies, and indeed for any organization whose executive leadership is involved.

In those organizations that involve large membership distributed over widely separated geographic districts it would seem that responsibility is best fixed by having a small committee—say a committee of five—elected from geographic districts properly proportioned, by compromising somewhat between per capita representation and geographic territory involved. The election of such a committee, in

which the local sections participate in the election of their particular representative, brings the sections together locally in a manner that is highly desirable. A committee of five composed in this manner is too small for cliques and yet it is remarkable how easily correspondence may be carried on concerning proposed candidates for office and the dispatch with which final discussions may be put through at the final meeting—certainly a strong recommendation in its favor.

The development of a healthy interest in the organization's affairs among outlying and growing districts of the particular organization is especially noticeable. The recently constituted nominating committee of the American Society of Mechanical Engineers is a forceful illustration. The five members of this committee initiated their work at the beginning of the year through correspondence and although perfect strangers to each other, their meeting at the Detroit gathering of the Society in June soon developed into an investigation of names in a manner that assured the most careful consideration of some two hundred names presented, although there were but seven officers to be nominated.

The Growing Force of Young China

The slow awakening of China has largely been due to the retarding influences of a corrupt and backward government. According to Julean Arnold, United States commercial attache in China, an article by whom is reproduced on a later page, the outlook for progress in that country is bright.

In this connection, the late spectacular protest of Chinese students against government corruption is of interest as showing the growing power of this new and progressive element. This protest has taken the form of a general strike among the students. A recent letter from Hangchow reports that they have so far obtained the sympathy of the merchants that many shops are closed and the owners say they will not open until the demands are met. Signs are pasted on the doors, "Put out the country's thieves or we will not open our doors." The first great issue concerning Tsingtao and the Japanese boycott has now given place to a general campaign against corrupt officials. Even trains stopped for a time and people by the thousand are walking the streets.

The demonstration is remarkable in view of the strength among the younger element which is indicated. China's greatest need is a stable government which will not sell out the rights of its own people. With even a promise of this possibility, the progress in the forms and ideals of western civilization would sweep ahead like a stream which has been dammed. Even as it is, the growing demand for electrical goods is but one evidence of a change which has slowly but surely been bettering the conditions of the whole vast country.

Six-Cent Fares and Public Opinion

There are few electric street railways which have not felt the need for a greater income to meet increased expenses and which have not already applied for six-cent fares. Of these few, practically all are now in the act of making such application. The question is going through the preliminary stages of newspaper discussion in San Francisco; in Denver the extra fare was once granted and then withdrawn at the vigorous protest expressed at the polls by the public asked to pay the higher fare.

In many cases the public has expressed a rebellious attitude. Justice, of course, is on the side of the company which asks nothing more than a fair return based on the expense which must be incurred, but it is not always possible to secure justice at the hands of the public, in whom the court has decided authority rests, particularly when former controversies have in some measure disturbed the good feeling between the utility and the public.

The zone method has been adopted in some cities to meet the need for increased revenue and at the same time preserve the convenience of a single coin, but the complications involved in the adopting of this system have militated against its application generally.

In this connection, attention is called to an article by C. E. Grunsky, the well-known valuation expert, which appeared some months past in the Journal of Electricity and which is now included in his book, "Public Utility Rate Fixing," recently published by the Technical Publishing Company. In this paper, Mr. Grunsky calls attention to the need for the community's granting an adequate recompense to the public utilities which serve it. He suggests that as the service rendered is of benefit to the entire community, some portion of the expense might fairly be borne by the taxpayer in the form of a remission of taxes to the utility.

A street car line benefits all property along its route, irrespective of the number of times the landowner rides on the cars; the mere fact that water service is available raises the value of land, whether the owner is connected to the mains or not. In strict justice the community should bear a portion of the burden of the return which is allowed the company. The more general recognition and application of this principle would enable the day of the six-cent fare to be indefinitely postponed.

THE NEW JOURNAL SERVICE: The Journal of Electricity has been undergoing a very rapid growth both editorially and in the breadth of territory served. The survey of electrical achievements and possibilities in the Pan-Pacific area which is the feature of this issue is typical of a wider service which is planned for future months. Further personal representation has been arranged both in this country and about the Pacific and the Journal of Electricity looks forward to a broader service in all fields.

A special Power Problem issue is planned for Sept. 1st which will contain an interesting review of some of the big new water power developments, as well as instances of effective steam power plant practice. Special attention is called to an article on "Cracking of Pin Type Corner Porcelain Insulators" by S. L. Foster, chief electrician of the United Railroads of San Francisco, which deals with an important insulator problem and which will be a feature of special interest in the Sept. 1st issue.

THE LA PLAYA DIVIDE

The precipitous slopes of the Andes rising abruptly to heights of from 16,000 to 20,000 ft. offer abundant water power and harbor as well rich mineral deposits, whose extraction calls for large orders of power house and mining machinery.

West Coast Electrical Trade With South America

(Although the importance of South America as a field for electrical goods may have been in some measure overestimated by American manufacturers, nevertheless the importance of mining and the growing industries west of the Andes offer an attractive field for Pacific trade. The conditions of the market with the disadvantages as well as opportunities of business conditions are here frankly presented in this report of the trade commissioner sent by the Bureau of Foreign and Domestic Commerce to investigate this field.—The Editor.)

So much has been said and written of late about South America as a market for goods made in the United States, that its importance may have been overestimated in the enthusiasm of those who are now for the first time learning about that continent. For this reason many electrical manufacturers have taken steps to enter the field in a manner that companies with more experience would call unwarranted. It is true that quantities of goods are used, and that in normal times there is a decided increase from year to year, so that it is equally unwise to underestimate the market. The aim of this article, therefore, is to present certain fundamental facts that may help the manufacturer to form an opinion regarding the extent to which he ought to push his products and something of the results he might reasonably expect.

The Western Coast

The continent of South America consists of 13 countries, no two of which are exactly alike, either topographically, economically, or politically. There is also a great difference in the characteristics of the inhabitants, their purchasing power, and their manner of living.

All the west-coast countries are mountainous, containing the high peaks of the Andes, and abounding in mines, small and large and in various stages of development. Some of the largest and most productive copper mines in the world are located in Chile, Bolivia, and Peru; hence, much of the heavy machinery imported is for this group. On the north coast Colombia and Venezuela have been making surprising progress in the last few years, and are now taking considerable quantities of insulated wire, lamps, and motors. These countries are mountainous over a large part of their territory; nevertheless, very little mining is being carried on, the sources of wealth being chiefly coffee, bananas, hides, and other products of agriculture and cattle raising. Apparently the greatest development will be made along this last line. Much of the interior of both countries is unexplored.

The following table will give a comprehensive idea of how the world war has brought the United States to the front in South American trade. It will be worth the efforts that will be necessary to hold this same proportion when business shall have reached its normal point again.

ELECTRICAL IMPORTS IN SOUTH AMERICAN COUNTRIES

Countries	South American imports of electrical goods in 1913				Exports of electrical goods from United States in 1917-18
	Total	From United Kingdom	From Germany	From United States	
Argentina	$9,756,234	$3,358,711	$4,892,538	$ 577,126	$2,626,163
Bolivia	612,022	200,349	297,464	5,922	33,522
Brazil	8,504,518	1,420,958	2,977,488	3,239,564	3,183,016
Colombia	159,343	20,000	10,000	127,929	284,298
Ecuador	150,000	2,500	2,500	100,550	100,033
British Guiana	35,000	10,000	10,000	10,000	41,372
Chile	2,288,292	346,141	1,636,215	194,834	2,162,887
Dutch Guiana	.....	.....	.....	.....	1,435
French Guiana	.....	.....	.....	.....	308
Paraguay	82,914	17,090	27,027	5,496	22,929
Peru	223,958	9,235	74,115	126,233	647,296
Uruguay	230,708	30,745	49,846	49,431	438,114
Venezuela	207,503	25,000	5,860	137,933	238,724
Total—Amount,	22,250,492	5,440,729	9,983,053	4,575,018	9,780,097
Per cent,	100.0	24.0	40.4	20.5	.....

Lower Purchasing Power of South America

The mistake is often made of taking it for granted that the average consuming capacity per capita is the same in South America as in North America. This is not true, and any selling estimate or campaign based on such false asumption is bound to result in disappointment. Briefly, the principal reason for this is that the South American countries being still in the pioneer stages of development, the

desires for modern luxuries or even conveniences are not yet so strong as in some other parts of the world. Moreover, as the wages paid are on a lower scale, while the prices of all imported articles are much higher than those of the country of origin, owing to the freight, duty, and other expenses incidental to importation, many things are quite out of reach of the greatest part of the inhabitants, even if they were educated up to their use. As an illustration of this situation, we may take the case of Peru, with a population of 4,500,000, of which it is estimated that 50 per cent are Indians, 35 per cent are half-breeds, Negroes, and Chinese, and only 15 per cent belong to the white race. Looked at in a most liberal manner, Peru as a market for electrical goods is no better than an American purchasing public of 100,000 people. This includes both the people as a whole and the foreign mining interests, whose annual business is a large proportion of the total. This is one of the extreme cases, but the same sort of allowances must be made for all countries.

The following table gives the area of each country, its population, and its estimated purchasing power expressed in terms of an equivalent population in the United States:

Countries	Area	Population	Equivalent poulation in United States
	Sq.miles		
Argentina	1,153,400	8,000,000	3,250,000
Bolivia	514,464	2,535,000	200,000
Brazil	3,301,950	25,000,000	2,800,000
Chile	290,000	3,800,000	760,000
Colombia	494,340	6,000,000	55,000
British Guiana	89,420	300,000	6,000
Dutch Guiana	46,352	90,000	.....
French Guiana	31,550	50,000	.....
Ecuador	275,331	1,500,000	50,000
Paraguay	164,090	750,000	30,000
Peru	680,000	4,500,000	100,000
Uruguay	72,057	1,250,000	85,000
Venezuela	394,154	3,000,000	75,000

This equivalent is based on the 1914 Census of Manufacturers, which places the value of electrical machinery, apparatus, and supplies made in the United States at $359,432,155. Allowing for an exportation of $30,000,000, and a population of 100,000,000, the domestic per capita purchase of electrical material is $3.29, while in South America it is less than $0.50.

Electrical Goods in Chile

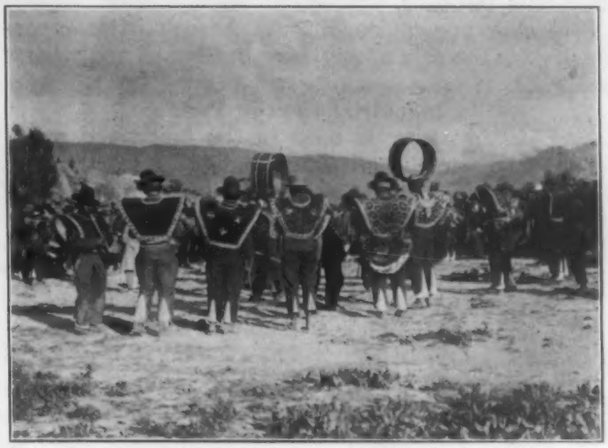
Although one of the smaller countries, Chile offers one of the best three markets for electrical goods. It has large and active mining developments

A GENERAL VIEW OF CUZCO, PERU

A glance at the character of dwellings and the absence of poles and wires indicates that electricity is not in common use among the inhabitants, in spite of the readily accessible water power. There is some industrial activity in the larger city of Lima.

and quantities of electrical material are employed in its nitrate fields. Many industries have been established under the stimulation of the abnormal conditions of the last few years, and everything possible is being done to extend them.

In the section from Coquimbo to Valdivia there is an abundance of water power, and the government has created a commission to study the possibility of constructing a longitudinal artery for the transmis-



CHRISTMAS CELEBRATION IN BOLIVIA

For domestic purposes, the market of electrical goods is confined to the three or four major cities of each country, the greater proportion of the population being Indians, of the type shown above. They do not use electric toasters—nor washing machines.

sion of power throughout this stretch. If this can be done successfully, it will make available a large amount of cheap power, which, in turn, will greatly encourage the establishment of more industries.

Business Conditions

The two larger central stations are in Santiago and Valparaiso, and since they are owned by German capital, their whole influence has been used to exclude material other than that of German manufacture. Presumably they will continue the same policies.

There are several smaller independent telephone companies, but most of the more important places are controlled by the Chile Telephone Company, an English concern with headquarters in Santiago. It is preparing to replace much of the older equipment with modern material.

The Chilean government has taken steps already looking toward the electrification of three sections of its railway system, and if the entire program is carried out it will mean the installation of a large quantity of generating and power apparatus. This subject has been discussed for 10 years or more but will probably be brought to a successful conclusion eventually.

Owing to the fact that business can not be handled from one central point, as in Argentina, there are fewer exclusive electrical dealers, this business being handled by the central stations or by hardware and machinery houses. It is necessary to have representation in several of the important cities, each of which is a purchasing center for the surrounding district.

Conditions in Bolivia

The only users of electrical material in quantity in Bolivia are the mining companies, and as these

have been enjoying several years of prosperity, they will probably purchase more heavily than ever in the near future. Each has its own generating plant, operated by water power or petroleum engines. The number of motors installed is being increased constantly. Personal representation is necessary to obtain this business.

Under present conditions, there is little opportunity for the sale of anything but lamps and wiring material.

Industrial Uses in Peru

Electric power is used in the large and small mines of Peru, the oil fields, and the sugar plantations, all of which are following a program of expansion as fast as conditions will permit. In or near Lima a number of small industries also use electric power.

The street railway system in Lima and Arequipa, and the telephone company in Lima use American material exclusively. The Central Railroad has been making studies of the electrification of its line, but apparently has not found that conditions warrant such a movement.

A great majority of the inhabitants are Indians and half-breeds, living in the high inland plateau, so that the consumers of household and miscellaneous devices are confined to not more than 15 per cent of the population.

Colombia and Venezuela Undeveloped

Colombia and Venezuela are noted more for their agriculture and allied industries than for their mines, with the possible exception of the gold and platinum and emerald producing region of Colombia. Some power machinery has been installed for the extraction of gold, but, in general, mining is done by hand labor.

There are many small central stations scattered through the interior and the number is constantly being increased. There are numerous small waterfalls that can be used for developing electric power for the near-by towns, as well as several large sources of power that could be used only provided current-consuming industries were to be established near them.

Owing to the difficulties and expense of traveling, it is desirable to secure active local representatives, rather than attempt to cover the field with factory representatives.

General Conditions

The climate of South America must be taken into consideration in these estimates, especially in regard to articles such as fans and heating devices. Nearly all the continent lies within the Tropics, but this does not mean that it is hot the year round. The altitude makes a great difference and much of the inhabited land reaches an elevation of 1,000 to 12,000 feet, so that even in places as near the Equator as Quito or Bogota, overcoats and blankets are not out of place at certain times of the year. At sea level the temperature on the west coast is not excessively high, owing to the prevailing westerly winds, which are chilled by contact with the cold ocean currents flowing northward from the Antarctic regions.

The natural tendency of the people as a whole is toward conservatism; consequently, new devices are adopted very slowly. By many it is considered unhealthy to have artificial heat in homes and offices. This feeling is disappearing gradually, however, and an example is being set by hotels, office buildings, and modern apartments, which are now installing either some central heating system or means for local heating.

Such wiring rules as there are permit the use of European designs, which in many things, particularly wiring devices, are much cheaper than American. There is little prospect of a radical change in this situation at an early date, though there is a strong movement toward an elevation of standards. That this condition exists is not at all surprising, since for many years European factories and merchants have had agents and representatives on the ground advertising and pushing their goods. They have established strong banks and commercial houses in large and small cities, and have earned, through hard work, the trade that is theirs.

During the last three years American banks have been established in a number of cities, so that today there is no considerable importing center without one. Any manufacturer, therefore, who wishes to enter this field, will find that he is able to secure credit information through them, as well as much other assistance.

OROYA POWER HOUSE, PERU

With water power in close proximity to the mines, it is customary for each to have its own generating plant. Andes mines have been enjoying a period of great prosperity during the war period and are now undergoing a program of expansion. The power house in the view shown is at the highest elevation of any power house in the world.

Resuming Trade With Siberia

(Siberia with her depleted stock of manufactured articles, offers an eager market for electrical supplies and apparatus. To what extent the field is open and the conditions and possibilities of stable trading, formed the subject of recent investigation by a sub-committee on markets and supplies of the Canadian Economic Commission in Siberia. A portion of their report as it was reviewed by the U. S. Bureau of Commerce is here presented.—The Editor.)

Siberia proper, exclusive of Russian Central Asia and the Steppes, covers an area of 4,800,000 square miles. This territory stretches for a distance of approximately 6,000 miles from the Ural Mountains to the Pacific Ocean and is bordered on the north by the Arctic Ocean and on the south by the outposts of the Chinese Empire, along the Mongolian and Manchurian frontiers. Within the borders of Siberia are found fertile plains of black earth, grazing prairie lands, rolling downs, rugged plateaus, extensive forests, and frozen Arctic wastes. The territory is rich in agricultural resources, furs, minerals, and forest wealth.

Geographical Divisions of Siberia

Geographically and economically Siberia may be divided into three main divisions: Western Siberia, which comprises practically the whole of the watershed of the Ob River, is made up of the Provinces of Tobolsk and Tomask and the districts of Akmolinsk and Semipalatinsk.

Central Siberia stretches from west of the Yenisei River to Lake Baikal and comprises the Provinces of Yenisei and Irkutsk. Most of this section of Siberia consists of forest lands, with patches of arable land.

The third district into which Siberia may be divided economically is that which is known as the Russian Far East and stretches east from Lake Baikal to the Pacific Ocean. Commercially, eastern Siberia has always been distinct from the rest of the country. The trade has been controlled for the most part from Vladivostok, foreign goods being imported by sea, while western and central Siberia received supplies of foreign merchandise by rail through European Russia.

Eastern Siberia may be said to be the least developed portion of the country, but on the other hand this district is rich in resources, which should be utilized to a greater extent in the future. This will be reflected in a rapid growth of trade with the Pacific ports of Russia.

Figures taken from the Russian Year Book of January 1, 1913, give the population of Western Siberia as 7,533,000; central Siberia, 1,461,300; eastern Siberia, 1,720,000; total, 10,714,300. To the foregoing figures must be added a considerable immigration from European Russia. The total population of Siberia at the present time must be in the neighborhood of 14,000,000 people.

Importance of Agriculture

The bulk of the population of Siberia consists of peasants who are engaged chiefly in the raising of cereal crops but who also keep cattle, horses, and other stock. The proportion of peasants to the rest of the population is said to be over five to two. This fact must be borne in mind in connection with the supply of merchandise to Siberia. There is also a limited trade in articles for consumption among the population of the towns, but in this connection it must be remembered that the general standard of civilization is not so high as in this country, while the purchasing power of the people is limited.

The Mining Industry

In addition to agriculture, the great resources of Siberia in minerals, forests, furs, and fisheries support a large part of the population. Mining is a most important industry throughout Siberia. The supply of machinery and equipment for the carrying on and extension of this industry must continue to be a trade of considerable proportions.

Industrial Development

The further development of the fisheries of the Russian Far East will lead to a demand for canning machinery and for a variety of supplies. The great dearth of all kinds of manufactured goods during the past few years has made Siberians realize the necessity for the establishment of home industries and for the utilization of the resources of the country in coal and iron. Inquiries are being made for machinery and equipment for the outfitting of textile plants, boot and shoe factories, clothing and shirt factories, button-making factories, leather plants, cigarette factories, meat canning and preserving plants, condensed-milk factories, vegetable-preserving plants, iron works, and factories producing agricultural tools and implements.

Present Obstacles to Trade

The chief obstacles to the relief of the present economic situation in Siberia are (1) the disorganization of transports and (2) the difficulties of financing shipments of goods purchased in foreign countries. The latter may be said to be dependent upon the former, so that the railway problem becomes the fundamental factor in the economic situation. There is said to be plenty of money in the hands of the peasants of Siberia, but they are unable to purchase with this money the articles which they require, owing to there being no goods on the market. The peasants are consequently reluctant to part with their produce so long as they can receive only more paper money in return.

The Siberian Market

Siberia is a market where cheapness is a consideration of great importance, owing to the limited purchasing power of the inhabitants, but quality must not be sacrificed for the sake of cheapness. Canadian and American goods enjoy a good reputation in Siberia, whereas Japanese manufacturers have spoiled the market for their goods in many lines by the poor quality of the articles that they have supplied.

Goods for Siberia should be securely packed to withstand rough handling on the railway and carriage into interior points off the railway. In this

respect the regulations regarding packing can safely be followed which apply to other export markets where transport conditions are similar.

In normal times the foreign-trade exchanges of western and central Siberia were conducted by way of the west; i. e., over the European land frontier, through the Baltic ports, the White Sea through Archangel, and to a certain extent the Black Sea ports. Eastern Siberia was dependent upon Vladivostok and the Amur River. The war, and subsequently the Bolshevist movement, has cut off Siberia from access to foreign countries through the Baltic and Black Sea ports, so that the whole country has become dependent upon Vladivostok.

Since the outbreak of the war the leading mercantile houses of western Siberia have found it necessary in their interests to open purchasing and forwarding agencies at the port of Vladivostok. There has also been a great increase in the number of independent trade organizations. Seven foreign banking institutions have established branches at Vladivostok.

The Cooperative Movement

The growth of the cooperative movement in recent years has made the cooperative societies the chief medium for the distribution of goods to the peasants of Siberia. The leading unions of cooperative societies have offices in Vladivostok. The cooperative societies in Siberia are of three kinds: (1) consumers' societies, (2) credit associations, and (3) producers' cooperatives. The cooperative unions may be said to embrace practically the whole of the peasantry of Siberia, and must therefore be considered the most important of the prospective purchasers.

The Principle of Barter

In addition to the cooperative societies, the provincial zemstvos, which are local-government bodies, undertake the distribution of agricultural machinery and other articles among the peasants.

For some time to come the principle of barter must be an important factor in the trade with Siberia. The development of the cooperative movement has rendered this procedure both practicable and less open to objection than it would be in other circumstances. Trade operations will undoubtedly be facilitated if the foreign seller is prepared to accept Siberian produce in payment for his goods.

The chief exportable products of Siberia are butter, hides and skins, flax, wool, cheese, bacon, grain, furs, lumber, minerals, and fish products.

In spite of the activities of cooperative and official organizations there is still a wide field left for the legitimate enterprise of private firms, distributing goods in Siberia and collecting produce for export abroad. These firms must continue to be the chief medium for the distribution of supplies among the population of the towns.

Electrical Needs

The installation and improvement of electric light plants, telegraph systems, waterworks, sewerage, fire-fighting apparatus, roads, and tramways in the towns of Siberia will lead to a demand for a large amount of machinery and equipment. Siberian towns are behind in such civic undertakings, but the future should bring in a great advance along the lines indicated. The only street railway at present being operated is the municipal tramway of Vladivostok.

Before the war plans had been drawn up for the construction of electric street railways at Omsk, Tomsk, Irkutsk, and Harbin, where the need is great. These plans should be put into execution as soon as conditions become settled. Practically all the existing electric light and telephone systems require extension and repair, while all the larger towns need the installation of up-to-date waterworks and sewerage systems.

Among the articles for which particular demand exists in Siberia are named the following:

- Wire
- Electrically driven pumps
- Dynamos
- Electrical apparatus
- Saw-mill machinery
- Woodworking machines
- Flour-milling machinery
- Paper-making machinery
- Mining machinery and equipment
- Boot-factory equipment
- Textile machinery
- Knitting machinery
- Machine tools
- General factory equipment
- Lamps and lanterns
- Electric light fittings

The distribution of population in Russia and northern China. Density is indicated by depth of shading. It will be seen that Siberia has largely a rural population with a few darker spots on the sea coast. In 1912 only 162 towns in all of Russia were provided with electricity, most of these in the western area, but this report indicates that several cities contemplate the installation of electric lights and trolley systems as soon as material is available.

Hydroelectric Development in Canterbury, New Zealand

BY L. BIRKS

(The extent to which electricity is being successfully applied in every department of civic, industrial and domestic life in all parts of the world has a stimulating example in the rapidly-developed New Zealand power project described below. The author is chief electrical engineer with the department of Public Works, Wellington, New Zealand.—The Editor.)

The history of the development of hydroelectric power in Canterbury is of fundamental importance and interest not only to the residents of that province but to the whole of New Zealand, owing to its bearing on the corresponding developments throughout the Dominion.

In 1910 the demand for a comprehensive hydroelectric scheme became very urgent, but the question was still at issue as to whether it should be taken up

LAKE COLERIDGE FROM THE NORTH, SHOWING THE INTAKE
This lake, located some thirty miles from Christchurch, is ideally situated for the development of hydroelectric power to supply the entire region.

by the city or the government. At last a working basis was reached under which it was proposed that the City Corporation should retain the reticulation and retail distribution of energy within the city area, and that the government should undertake the development of the water-power, selling the energy in bulk to the city and retaining the right to supply to the railways, tramways, and to local authorities outside the city limits. Moreover, as part of a much larger system, the cost per horsepower both of installation and of operation would be substantially lower than from a smaller self-contained scheme limited to the city requirements.

Lake Coleridge

In August, 1910, the Aid to Water-Power Act was passed, and the Lake Coleridge scheme assumed a definite shape. Lake Coleridge has an area of about thirteen square miles, lying at an elevation of 1,667 ft. above the sea, and at a distance of sixty-five miles almost due west of Christchurch. The outlet of the lake is at the western end—that is, towards the mountains; and the outlet stream, carrying normally 100 to 200 cusecs of water, joins the Harper, then the Wilberforce, and then the Rakaia, doubling back to the south and east and flowing parallel to the lake for its entire length. At the eastern end the Rakaia River bed is 500 ft. below the lake level, and less than two miles distant from the lake shore, giving an ideal opportunity for the development of hydroelectric power. In addition to the existing flow from the lake the supply of water can be supplemented when required by turning into it part or the whole of the flow of the Harper River, 400 to 800 cusecs, and the Acheron River, 30 to 60 cusecs. The available power for future development is thus very high, running up to 20,000 kw. of continuous load, or 40,000 kw. on a 50 per cent load factor.

From the lake the water is taken through the ridge separating it from the Rakaia River by a submerged tunnel, 7,000 ft. long and of semi-elliptic section, 8 ft. high and 8 ft. wide. The crown of the tunnel at the lake shore is 12 ft. below normal lake level, and has a grade of 1 in 1,000—that is, a fall of 7 ft. in the length.

The power house is a substantial ferro-concrete structure, 180 ft. long, 70 ft. wide, and 40 ft. high, and is built complete to house the whole 12,000 kw. of plant.

It is provided with complete lightning-arresters, traveling-crane, compressed-air system, transformer-oil drying and filtering system, machine-shop, fitter's shop, blacksmith's shop, stores, and garage.

The staff are provided with sixteen cottages, all equipped with complete electric lighting, heating and cooking systems. A suitable school, a small farm, and extensive plantation have been provided.

From the power house the energy is conveyed to Christchurch over two independent transmission lines, each sixty-two miles long, and terminating at the main distributing station at Addington.

ELECTRICITY FOR THE DAIRY
All of the dairies and butter factories within reach of the lines are supplied with electricity. Separators, churns and milking machines are electrically operated.

Large Consumers

The Christchurch city council takes control of the whole of the recticulation within the city boundaries, purchasing the energy in bulk from the

department at 15,500 volts pressure, and supplying their own transforming and distributing stations, at which the pressure is reduced to 400/230 volts, three-phase, for retail supply.

The immediate effect of the introduction of hydroelectric power was a striking reduction in the council's retail and wholesale charges for electricity. The demand within the city has gone up from about 700 kw. to 2,200 kw., and is still increasing rapidly. At the end of the last financial year there were 4,217 consumers connected to the city mains, and the connected load amounted to 8,817 kw.—that is, four times the maximum demand at any one time. That is to say, the city is able to sell the 2,200 kw. which it buys from the Department at least four times over to the different consumers during the day.

In illustration of the fact that electricity is the "poor man's light," 1,400 of the above consumers—that is, 33 per cent—pay less than 4s. per month, and 1,700—that is, less than 40 per cent—less than 5s. per month.

Next to the city council the largest consumer is the Christchurch Tramway Board. Their plant consists of two rotary converters, one of 1,000 kw. and one of 500 kw. capacity. Their normal day load is 1,400 kw. and their holiday peak is 1,700 kw. They also have five boilers of 2,000 kw. total capacity and four steam turbines of 2,500 kw. total capacity, which are maintained for emergency supply in case of accidental stoppage of the supply from Lake Coleridge. This steam plant is capable at short notice of carrying the whole tramway load, and also feeding back 500 to 1,000 kw. to Addington distributing station for the use of other essential services. The Lake Coleridge supply has reduced the cost of operating the trams by about £2,500 per annum, besides rendering it independent of the coal-supply.

Varied Applications

At Islington, Belfast, and Kaiapoi three large freezing works are supplied by means of indoor static transformer stations of 600 kw. and 300 kw. capacity from the primary feeders at distances of six to fifteen miles from the Addington distributing station. Their load consists mainly of large freezing-motors of 100 hp. to 500 hp., running on a seasonal load from November to about July in each year, but running twenty-four hours per day during most of the killing season.

Flour mills situated within the city boundary, and several outside the city are supplied from the primary feeders. The prices at which energy is available from Lake Coleridge have enabled the cost of milling-power to be reduced from about 4s. 6d. per ton to about 2s. per ton. Moreover, the absolute uniformity of speed and rotating effort of the electric motor as compared with the steam or gas engine has made a great improvement in the operation of the milling-machines, and there is a strong demand for extension of the mains to other milling centers.

All the seven tanneries and fellmongeries in the district, apart from the freezing-works, are supplied, in addition to steel-smelting, seed-cleaning and chemical plants.

The whole of the dairies and butter-factories within reach of the mains are supplied, in spite of the necessity of keeping steam in most cases for scalding, washing, and pasteurizing. For separating and churning the steadiness and uniformity of speed are of great advantage as compared with the steam-engine. For milking-machines the ease of starting and stopping, and the unattended operation of the motors, as well as the cheapness of the power as compared with petrol or kerosene fuel, determine the matter without question, and are making quite a revolution in dairying wherever the mains are accessible.

The Tai Tapu Dairy Company has not only taken a supply for operating its butter-factory at Tai Tapu, but has installed a complete reticulation throughout the area occupied by its milk-suppliers. The resulting stimulus to the industry is already marked. When a farmer wants to select a site to settle down the convenience, economy, and comfort of an electric supply are decided factors.

Large quarries and brickyards are now driven by Lake Coleridge power. In these cases the large instantaneous overload capacity of the electric motor is of the utmost value. It is found in nearly every case that the former engines were very much overpowered for their average work, owing to the necessity of their carrying an occasional momentary overload without pulling up, which the electric motor does without difficulty.

Economy of Coal

A very important aspect of this subject is the economy of coal used in Canterbury as the result of the operation of the Lake Coleridge plant. To some considerable extent the electric power has replaced kerosene and petrol instead of coal, but to this extent the saving is of even greater national importance in that it has substantially reduced ocean and railway transport, and has reduced the national liability to foreign creditors by probably £10,000 per year.

Unlimited Possibilities

If the Lake Coleridge system did nothing more than supply one electric iron and one washing machine in every home in Canterbury it would justify a complete installation, perhaps not quite as large as the one that has been put in, but equally complete in every way, and would pay.

The future is unlimited. Every estimate that is made of the demand is doubled and trebled. A new application is developed, and all previous forecasts are left behind. The electrification of the railways is only one of numerous outlets. The railways themselves have a limit when every village has its electric service. The telephones have their limit when there is an instrument in every house. But when electric service is laid on to every house in the land the development of electric supply will be only commencing.

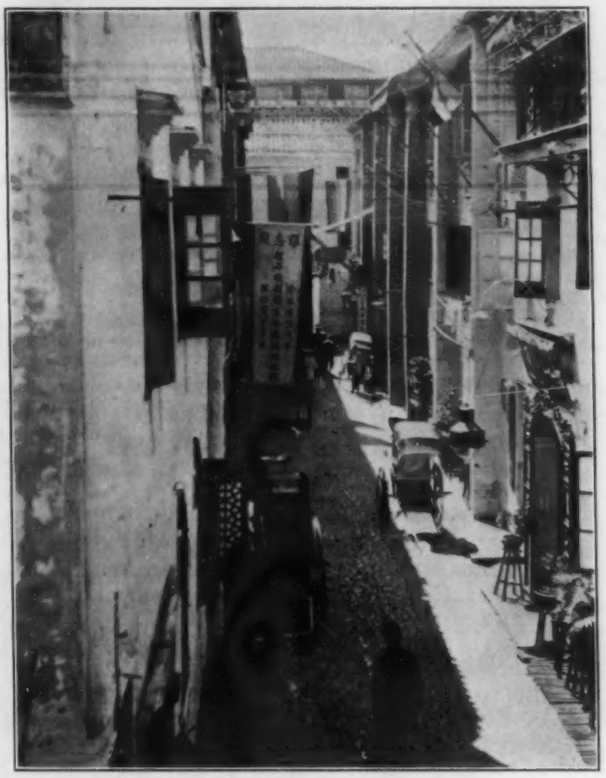
In the cities the business will be shared with the gas companies, but the great future of electric supply lies in the country districts—in the decentralization of our industries and the return of our people from the congestion of the cities to the healthier life and surroundings of the country.

China's Industrial and Commercial Outlook

BY JULEAN ARNOLD

(For those who have tended to regard China as a nation aloof from modern progress, as an immovable devotee of a hoary Asiatic culture, having little possibility of industrial development and less desire for it, the following sympathetic account will contain much that is new and encouraging. The obstacles to rapid development, and the progress which has been made in spite of them, together with an interesting range of possibilities for the future, should throw light on a number of hitherto disregarded aspects of China's growth. The author is American Commercial Attache at Peking.—The Editor.)

Many westerners today contrast unfavorably undeveloped, disorganized China with a well ordered and strongly ruled Japan, and rashly decree that China is fated evermore to remain undeveloped and disorganized unless some strong power from without imposes a dictatorship and orders the railroads built, the mines developed and all the material blessings of modern science and industry bestowed upon it against the protest of a people whose civilization, antedating that of all nations extant today, should entitle them to a voice in the matter.



A STREET IN MACAO

Not only did jin-rikshaws form the main means of conveyance in the streets of old China, but hand carts pushed along the roads carried produce for many miles to market. The chief evidence of China's awakening lies in the plans for better transportation both within the cities and without. China's potentialities in electric railways and hydroelectric power are extensive. So congested are the streets in this and the neighboring city of Canton, that it is planned to put an electric "tram" on the wall which surrounded the old city.

Causes of China's Backwardness

It is because Japan has been able to do what it has during the past forty years that we should dispel pessimistic views regarding the future of its larger, wealthier western neighbor. Unsympathetic or superficial critics of the Chinese people fail to take cognizance of a number of factors which naturally have prevented rapid development among the loosely organized, democratic pacifist people of China, among which are:

(1) The extensive area of the country, its continental nature, its natural barriers which have cut it off from contact with the outside world and its large population.

(2) The perpetuation through a period of many centuries of a system of education which, like the education of mediaeval Europe, directed the minds of the people to the past and cast the intellect of the nation in a mould. This system in China encouraged the development of individual, as represented by the family unit, rather than group or social activity.

(3) The lack of a military caste or an aristocracy which, when the need of change became apparent, might have assumed the leadership and hastened developments, as in the case of Japan. In democratic China progress must proceed from the bottom up rather than from the top down—a slower process.

Phenomenal Changes During Last Twenty Years

To those who continue to criticize China for what they term a lack of ability to do anything for itself, let us point to the phenomenal developments of the past twenty years, developments which show for little on the surface but speak volumes for the future because of their very depth. Among these may be mentioned:

(1) The abolition of the system of education based upon the classics and the substitution in its place of a system based on western models. This means that China is executing the order "about face" and looking into the future and away from the past.

(2) The development of a constitutional government has come as a result of China's contact with the west. The events of the past twenty years will be recorded in history as epoch making in their influence on the extension of constitutional and representative governments in the Far East.

(3) The rise and growth of the native press, which is quietly assuming an influential position in forming a public opinion among the Chinese people. Foreigners in China do not all appreciate the force of this army of educators represented by the native press which is in evidence in every city of China and which has had its inception since 1900.

(4) There is no one development in China during the past twenty years which lends more hope for the future or indicates more clearly that the people are sound at heart than the effective work which has been done by the Chinese themselves to rid their country of the curse of opium, and this in spite of the lack of a strong centralized government, in spite of its revolution and rebellions, and in spite of the efforts of certain interests to force the drug on the people.

(5) Probably the greatest development in China in its significance for the future is the growth of a national spirit which, as modern educational facilities increase, will go forth with greater strides.

How the West Can Help China

We have, then, in the above five factors making for progress in China, great essentials to the development of a free and strong people. With this foundation the west need not fear for the future of China so long as the west adopts an attitude of sympathy and establishes its relations in such a way that the principles of the open door and of equal opportunity become an actuality; and they cannot so become until all so-called "spheres of influence" are abolished and all foreign railways in China are inter-

nationalized and deprived of all political significance.

The per capita trade of the United States is $85, thirty-four times that of China. China's foreign trade should exceed that of the United States, for it has a wealth of cheap labor potentially efficient, and the raw materials and natural resources in her own and contiguous territory. During the past 30 years China's foreign trade has increased tenfold in spite of unfavorable conditions. It may be expected that during the next 30 years it will increase another tenfold.

Must Develop Communication Facilities

To reach these figures in her foreign trade China must, in the first place, develop adequate communication facilities, which mean roads, railways, waterways, telegraphs and posts. Of equal importance with railways are good roads. The farmers of Shensi, on the rich fertile lands of the Wei Basin, raise 30 and 40 bushels of wheat to the acre, and because of their dependence on cart and pack animal transportation, which cost them from 8 to 18 cents Mex. a ton mile, they are unable to get this wheat to the Hankow or Shanghai markets, where it commands three times the price it does in Shensi. Thus the more they raise over and above their own wants, the worse off are they.

It is gratifying to note the growth of an interest in China in good roads. Beginnings have already been made. Foochow, Changsha, Tsinanfu, Peking and Shanghai have inaugurated work on good roads. In all of China there are less than 10,000 motor cars and less than 1,000 miles of good roads.

Foreign Railway Interests to be Internationalized

Unfortunately, the attitude of foreign nations toward railway building in China has not been conducive to developments in a larger way. The object of railway construction should be to open the country generally and to look for the returns from these larger developments rather than to treat the railway as a commercial asset in itself. Railway agreements have been so drawn as to present in actual practice obstacles to further railway developments on the part of other interests, and hundreds of thousands of square miles of fertile lands lie undeveloped and unoccupied in China because of lack of railway transportation facilities to render them accessible and open them to colonization and development.

Potentialities in Electrical Development

Another subject new to China is the electric railway and the development of its hydroelectric power possibilities. There are in operation in the United States 50,000 miles of electric railways, including city and suburban lines. Of a possible 60,000,000 hp. of hydroelectric power the United States has developed 6,500,000. China's potentialities in electric railways and in hydroelectric power are marvelous, but remain to be developed.

Waterway transportation in China is in some respects very advanced, for the reason that a large area and population have had to depend on it. No country in the world has as large a boating population as has China. Certain sections of the country are networks of canals which reflect great credit upon China's engineering capacity centuries ago. Internally much can be done by coordination, conservancy and extension to improve China's wealth of waterways.

Communications also include telegraphs, cables, postal facilities and telephones, all of which add to the wealth-producing possibilities of a people. China has 11,000 miles of telegraph wire as compared to America's 1,627,000 miles, and in telephones the aggregate is probably less than 25,000, while New York City alone has 550,000.

Next in importance to transportation facilities are improvements in agriculture and industry. The foundation of China's prosperity depends upon its agricultural wealth. At present it is estimated that about 70 per cent of the population is agricultural as compared with 44 per cent in America. Nothing indicates more clearly developments in the United States in agriculture than does the fact that over 50,000 patents have been granted on agricultural implements and machinery.

During the next few decades farming in China will be revolutionized, if it keeps pace with the industrial and commercial progress of the country.

The following notice appeared in several Esperanto magazines recently to announce the plans of the Journal of Electricity in regard to the Esperanto matter appearing in this issue:

INTERNACIA KOMERCO KAJ INDUSTRIO

Esperanto kaj la Elektra Industrio

La laboro de la praktikuloj, kiuj celas la ekondukon de Esperanto en la komercadon internacian, ankoraŭ alportadas kontentiagajn rezultojn. Dum preskaŭ unu jaro la "World Salesman" (Jokohamo) aperigas esperantan fakon, kaj nun, ŝajne kiel rezulto de tio, ni sciiĝas, ke la "Journal of Electricity" (San Francisco) intencas dediĉi kvin pagojn al nia lingvo en sia aŭgusta numero. Antaŭ kelkaj tagoj la C.C.L.C. londona ricevis tre afablan kaj interesan leteron de Sro. Robert Sibley, la redaktoro, kune kun ekzemplero de la "Journal." Kiel metia aŭ profesia gazeto, ĝi estas modelo de bonstila presarto; la centopa paĝaro enhavas multe da bele desegnitaj kaj okulfrapaj anoncoj de la plej gravaj firmoj en Usono; la teknikaj informoj kaj artikoloj liveras veran edukadon al ĉiuj interesataj pri elektraj aferoj.

Al ĉiu esperantisto-elektristo ni ne povas ne diri, "Akiru ĝin, prunte, ŝtele, aŭ abone, sed nepre ĝin posedu, precipe kiam aperos en ĝn Esperanto. Elektristoj, kiuj deziras pluan informon skribu al S. R. Marshall, Hon. Sek., C.C.L.C., Ludgate Circus, London, E.C. 4.

The eleventh international Esperanto conference was held in 1915 at the Panama-Pacific Exposition Grounds in San Francisco. The series was interrupted by the war disturbances, but will be resumed in 1920.

Esperanto as an International Language

BY W. R. DAINGERFIELD

(In view of the constantly expanding relationships of modern commercial life, anything which aims to simplify intercourse merits the attention of business and professional circles in all countries. The Journal of Electricity has under consideration a series of articles amounting to a brief course in Esperanto, and any comments on the subject from our readers will be welcomed. Should the idea meet with sufficient interest the series will probably begin in our next foreign issue.—The Editor.)

ESPERANTO

La unu precipa bono el la jaroj da mondsangado kaj batalado ĵus pasintaj estas la sento, disolviĝinta tra la civiliza mondo, ke necese estas, ke estu pli proksimigaj ligiloj de simpatio kaj interdonado de ideoj inter ĉiuj popoloj de la mondo. Komuna komerca lingvo estas la bezono de la nuna horo.

Esperanto ne estas intencita kiel universala lingvo laŭ senco ofenda, por esti konkuranto de la angla, franca, itala aŭ ia alia nacilingvo. Ĝi estas dua lingvo por ĉiuj utiloj, iom tiel, kiel la latina lingvo estis, tamen por pli limita celaro, autaŭ tricent jaroj. Esperanto estas la solvintaĵo de la problemo pri la Turo de Babelo, kaj estas nomita "La Latina de Moderna Demokratic."

Estis 250 sensukcesaj provoj de la pasintag 250 jaroj solvi la malfacilogn naskitajn de la multeco de lingvoj. Fine en 1887 Doktoro L. L. Zamenhof, polo okulisto, eldonis Esperanton, ĝin provinte kaj provadinte naŭ jarojn ĉe siaj amikoj. Li elektis radikojn komunajn a la ĉefaj eŭropaj lingvoj kiel bazfundon de Esperanto, forigis la neregulajn verbojn, malfacilan ortografion, kaj ĉiujn esceptojn de la reguloj de ĝia simpla gramatiko, kaj, per sistemo de prefiksoj kaj sufikdoj almetata a la radikoj, simpligis preskaŭ ĝis nekredebleco la vortaron de la ĉiutaga.

En 1905, kaj ĉiujare pste gis 1913 inkluzive, Esperanto kunvenigis naŭ internatiajn kongresojn, ĉiufoje malsamurbe. La dekan disrompis la erupcio de la tutmonda milito. La dekunua akazís kvazaŭ fragmente en 1915 ĉe la Ekspozicio en San-Francisko,

ENGLISH

The one great good of the years of world carnage and strife, just passed, is the feeling that has developed throughout the civilized world for the necessity of closer bonds of sympathy, and interchange of ideas among all peoples of the world. A common commercial language is the demand of the hour.

Esperanto is not intended as a universal language in the offensive sense of being a rival to English, French, Italian, Spanish, or any other national language. It is a second language for all purposes whatsoever, somewhat as Latin was, though for more limited purposes, three hundred years ago among the learned. Esperanto is the solution of the problem of the Tower of Babel, and has been called the Latin of Modern Democracy.

There have been about 250 unsuccessful attempts in the past 250 years to solve the difficulties caused by the diversity of languages. Finally, in 1887 Dr. L. L. Zamenhof, a Polish oculist, published Esperanto, after having tried and tested it for nine years among his friends. He selected roots common to the principal European languages, as a basis for Esperanto, abolished irregular verbs, difficult spelling and pronunciation, and all exceptions to the rules of its simple grammar, and by a system of prefixes and suffixes applied to the roots, he simplified the vocabulary of every-day life to an almost unbelievable extent.

In 1905 and each year thereafter, Esperanto has held, up to 1913 inclusive, nine international congresses, each time in a different city. The tenth was broken up by the outbreak of the world war. The eleventh was held in a fragmentary way in 1915 at the Exposition Grounds in San Francisco, and the

kaj la serio redaŭriĝos en la venonta jaro. Tiuj ci kongresoj estas demontrilo al la tuta monda pri la utilo de Esperanto, kiel preta rapidega kaj ĝustiga komunikilo inter ĉiuj nacionoj, kaj inter homoj multjaraj kaj malmultjaraj, kleraj kaj malmultkleraj. Ĝi estas tute lernebla en de unu kvinono al unu kvindekono de la tempo bezonata de la franca, itala aŭ hispana lingvo.

Se ĉiuj imfanoj civilizitaj komencus studadi Esperanton hodiaŭ, tiam en unu jaro post la venonta Kristnasko ili skribadus kaj paroladus inter si reciproke kun libereco kaj fluparoleco kiaj neniam praktike efektiviĝis ĉe fremlanda lingvo. La lingvaj baroj de la pasintaj epokegoj disrompiĝus.

series is to be resumed next year. These congresses are a demonstration to all the world of the utility of Esperanto as a ready, swift and accurate means of communication among all nationalities, and among persons of all ages and degrees of education. It can be learned thoroughly in from one-fifth to one-fiftieth the time necessary for French, Italian or Spanish.

If all the children of civilization should begin to study Esperanto today, then, by one year from next Christmas they would be writing to, and talking with one another with a freedom and fluency never practically realized in any foreign language. The barriers of the ages would be broken down.

Your Foreign Business Agent

(Do you realize the extent of the service which the U. S. Bureau of Foreign and Domestic Commerce is prepared to give you? The following review of its activities will suggest avenues of information along all lines of foreign trade of which the electrical exporter will wish to avail himself.—The Editor.)

The changed position of the United States in the business world demonstrates most conclusively the vast importance of foreign trade and the possibility of its expansion. This country is now a creditor instead of a debtor nation. During the past year the United States did an export business of about $6,150,000,000, as against an import business of $3,031,000,000. The month of January, 1919, showed the largest exports of any single month in American history, and every effort should be put forth to sustain and develop this great commerce with the buyers overseas.

The Bureau of Foreign and Domestic Commerce —

To that task the Bureau of Foreign and Domestic Commerce is dedicated. Figuratively, it may be said to have its finger-tips on all the markets of the world. To it, through the State Department, report more than 300 consular officers. The commercial attaches—sometimes called "trade diplomats"—are stationed in the principal capitals. Their activities have to do with the broad aspects of commercial matters, with policies and developments affecting whole regions, with the changing phases of international trade relations. Trade commissioners, on the other hand, are men with specialized commercial and technical training, who are selected to make trips abroad, studying in detail the markets for particular lines of goods, such as cotton goods and shoes.

Representatives of the Bureau of Foreign and Domestic Commerce go to Great Britain, France, Switzerland, Italy, Denmark, Norway and Sweden, Greece, Roumania, South America, Japan, and other countries as commercial attaches, to be attached to the United States embassies, while others are sent on special missions to investigate specific classes of merchandise, such as textiles, electrical goods, industrial machinery, and the like. For example, an electrical expert has gone to Madrid to make a special investigation, while another representative has undertaken an investigation into the need for industrial machinery in the Far East, including British India, China, and Japan.

Divisions of the Bureau —

The Bureau of Foreign and Domestic Commerce is made up of a number of divisions. The Division of Foreign Tariffs furnishes information concerning foreign tariff and customs laws and regulations, commercial policies of foreign countries, foreign trademark and patent laws, embargoes and import prohibitions, and foreign consular regulations. The Research Division supplies information on import and export statistics of all foreign countries; it does translating and research work of any sort connected with foreign trade. The Division of Statistics furnishes figures on the trade of the United States with all other foreign countries, the statistics being supplied monthly, quarterly, and yearly. The Far Eastern and Latin American Divisions provide information, in their respective fields, concerning markets for American products, general trade conditions, regulations affecting commercial travelers, the industries and resources of nations, and many other matters that are related, directly or indirectly, to the sale of American goods.

The information collected by the Bureau is distributed mainly through its district and cooperative offices, its Trade Information Division, and the publications issued by its Editorial Division.

The Trade Information Division furnishes to American business men a very great variety of information on foreign markets, including proper methods of packing, the financing of export shipments, the sources of foreign credit data, the names of dealers and importers abroad.

The Bureau maintains district offices in New York, Boston, Chicago, St. Louis, New Orleans, San Francisco, and Seattle, as well as cooperative offices in other cities. These offices are recognized centers for reliable information regarding domestic and foreign trade. They adjust trade differences. They render special service to foreign buyers seeking goods in the United States.

Commerce Reports —

Through the daily publication, Commerce Reports, and numerous special monographs, the Edi-

torial Division makes available to the business public information on commercial and industrial conditions in all parts of the world. This Government commercial newspaper is sent daily to more than 6,000 paid subscribers. It contains authoritative articles prepared by American representatives, excerpts and translations from foreign publications, commercial statistics compiled in the Department of Commerce, and brief items covering business conditions in all parts of the world. One of the most practical and immediately valuable features is the list of "Foreign Trade Opportunities"; American exporters who watch this list and take advantage of the openings mentioned in it are often able to sell large quantities of goods that would not otherwise have found their way to foreign markets.

The Bureau of Foreign and Domestic Commerce also issues many books and pamphlets (many of them appropriately illustrated), varying in size from 16 to 500 and 600 pages. These include general commercial handbooks, publications on foreign tariffs, and monographs presenting the detailed results of investigations into foreign markets for specific lines. Among the books being published are those entitled "Furniture Markets of Chile, Peru, Bolivia, and Ecuador," "Electrical Goods in China, Japan, and Vladivostok," "Construction Materials and Machinery in Chile, Peru, and Ecuador." These monographs, like others of the Special Agents, Special Consular, and Miscellaneous Series, are sold at nominal prices by the district and cooperative offices of the Bureau, as well as by the Superintendent of Documents, Government Printing Office, Washington, D. C.

Business Service —

No business is too small to derive benefit from the activities of the Bureau. No question, if genuinely pertinent to imports and exports, is too trivial to be investigated by its corps of workers. One day the Bureau may be called upon to answer an inquiry from an American canner: "Are skins taken from pimientos before they are ground into paprika?" The next day consideration may be given to the building of a railway, an electric power plant, or some other public work in Latin America or the Far East.

Here, then, is the Government agency through which American business men may learn the best methods of conducting export trade—the medium through which they may obtain definite, detailed information concerning the requirements of foreign markets.

The American Government has provided this organization. It is for American business men to understand its functions and take advantage of them.

THE FUTURE OF ELECTRICITY IN SHANGHAI

(A virtual barometer of industrial development in Shanghai is supplied by the records of the local power company. These show a steadily increasing demand for electric power in spite of war conditions. —The Editor.)

In spite of the war, the demands for electricity in Shanghai, China, have greatly increased during the past year, according to T. H. V. Aldridge, engineer-in-chief of the Shanghai municipal electricity department, in a recent article appearing in the London Electrical Review.

The future of Shanghai depends on industrial development which, in turn, is dependent on electric power supply. China cannot expect much development of water power for the production of electric power; she is dependent upon coal for her industries, and is content to import it, although, as the following figures show, she is one of the three countries most richly endowed with coal resources:—

	Short tons
United States, including Alaska	4,231,352,000,000
Canada	1,360,535,000,000
China	1,097,436,000,000
Germany	466,665,000,000
Great Britain and Ireland, etc.	208,922,000,000

China has a very long way to go before she can begin to approach the commercial and industrial activities of European countries, but she possesses two of the principal minerals—coal and iron—with which

The textile trade now furnishes the heaviest load of the Shanghai power company. China is evidently progressing from the hand to the power using stage.

to build up her state. If, as indications certainly suggest, Shanghai is to become increasingly important as a manufacturing center, it must have cheap electric power, and it cannot have that without cheap coal.

Since the Armistice there have been signs of renewed activities, which clearly show that an era of industrial expansion may be confidently looked for in the next year or two. The textile trade is, so far, the largest user of electric power, after which comes flour milling. It is significant that practically all the new mills and factories which have been established during the past five years operate by electric power purchased from the electricity department rather than from individual steam-power plants of their own. In the older mills, which are driven by steam power, the conversion from steam to electricity is gradually, but surely, taking place.

Shanghai, with cheap electric power, may yet develop into a steel-producing center. The city is better equipped and organized for manufacturing processes than any other city in China. Generally speaking, it is true that the prosperity of a city depends not only upon the magnitude of any one particular industry, but upon the diversity of industries, and on the recognition of this axiom and its practical application the future of Shanghai, as the first city of China, to no small extent depends.

THE FOREIGN TRADE CONVENTION

(The group which came together recently at Chicago to discuss the practical problems of foreign trade took a step of great significance to the west coast in deciding upon San Francisco as the scene of its next annual convention. Following is a summary of some of the principles taken up by the gathering, and of the outlook for the next year.—The Editor.)

By a unanimous vote of the sixth annual Foreign Trade Convention, recently held in Chicago, it was decided that next year's convention should take place in San Francisco.

Western Delegation —

A large western delegation attended the Chicago gathering, and did active and important committee work. The subjects taken up in convention were very varied, ranging all the way, according to one account "from the proper method of packing a box for export, to the most difficult problems of international finance."

Meetings —

Besides the formal meetings there were group meetings at which the various subjects were discussed intensively; in addition, anyone interested could receive personal advice from experts in the various lines, and large numbers took advantage of the privilege.

Foreign Trade and the Pacific Coast —

The particular interest of California in foreign trade is at present that of the import and export rather than that of a manufacturing community. For this reason, the railroad rates established for export and import commodities are of special interest to the West; and the fact that these also affect the trans-continental shipment of iron and steel products necessary for the profitable loading of outgoing ships, induced the western representatives to make special efforts to bring the point home.

Representatives from Seattle, Portland and San Francisco had an audience with the chief of the Traffic Bureau of the Railroad Administration, who was of opinion that the interests of the Railroad Administration also pointed to moderate transcontinental rates, and agreed to receive further data from a committee of Pacific Coast experts then in Washington.

The need for a continued shipbuilding program and increased maritime activity was among the strongly accented points of the convention. It is believed that if sufficient tonnage were available on the Pacific Coast, regular lines would be operated with a view to economical trans-oceanic shipment of grains, fruit and other produce. Foreign trade is unnecessarily limited by directing all or most seagoing commerce through eastern ports.

General Sentiments —

A summary of the outstanding sentiments of the convention includes the following:

1. The need for a continuation of a progressive and intelligent shipbuilding program that would release the ships at a fair valuation to private ownership, to be operated with some degree of government support.

2. The return of the railroads to private ownership.

3. The restoration of the telegraphs.

The Seventh Convention —

The next annual convention will undoubtedly bring an exceptionally large and representative gathering to the Pacific Coast. The Chicago vote showed that the idea was received with the greatest enthusiasm, and it is expected that numbers of those attending will make the seventh annual convention the occasion of a prolonged visit to this section of the country.

A UNIQUE HYDROELECTRIC INSTALLATION AT BOMBAY

(Peculiar conditions in countries having an irregular rainfall and a long dry season must be met by special developments in the way of hydroelectric installation. An interesting example of this is provided by the Bombay plant described below.—The Editor.)

A hydroelectric plant located some 2,000 feet above and about 40 miles from Bombay, which must meet conditions under which the water courses are dry for nine months of the year, is described by R. B. Joyner in a recent paper before the Institute of Civil Engineers, as reported in Engineering and Contracting.

It was found necessary to provide sufficient storage to give about 100,000 hp. for 10 hours or 12 hours a day during about nine months of the year when no rain falls. Lakes are formed by four masonry dams ranging from about ¾ of a mile long and 34½ ft. high to about 1½ miles long and 96 ft. high. The "monsoon" lake formed by two of these suffices to provide power for three months or more continuously, while the others are for storage, and maintain the supply during the eight or nine rainless months. The combined available capacities of the storage lakes is about 10,100,000,000 cu. ft., the excess over the necessary 6,700,000,000 cu. ft. being allowed on account of the very variable amounts of the monsoon rains.

From the monsoon lake and from the two storage lakes two ducts lead to the top of the rocky wall bounding the Deccan plateau on the west. From there two lines of steel pipe lines lead the water down the precipitous slopes to the power house some 1,750 ft. below. The pipes at the top are 82½ in. in diameter, and 72 in. at about two-thirds of the distance down, where they are joined by a double swan-neck pipe. From this eight smaller pipes are led down to the power house, each supplying a Pelton-wheel turbine designed to give a maximum of 13,500 horsepower.

These works are the largest of several similar hydroelectric works which have been constructed during the past decade, and are the first works to store water for power for use during about three-fourths of the year. One of the masonry dams, on an estimate of the exposed face area, is probably the largest yet constructed.

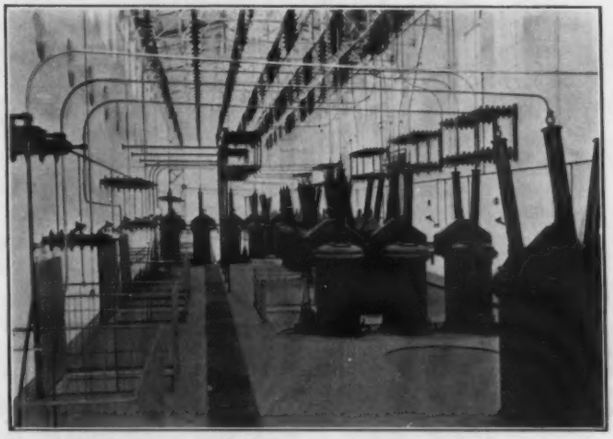
The Undeveloped Water Powers of Japan

BY HACHIJI HIGO

(A most complete survey of the available water powers of Japan has been undertaken by the Japanese government, a foresighted step which reflects the favorable attitude with which that country regards the electrical industry. It is predicted that a large section of the government railway is soon to be electrified and other large projects are contemplated. The following data formed part of the official report of the director-general of the Bureau of Electrical Exploitation of Japan.—The Editor.)

Purpose of the Survey —

In order to investigate all possibilities for hydroelectric power sites for industrial purposes, and to collect necessary and reliable data for the future hydroelectric undertakings in Japan, a survey of water powers has been undertaken. The work includes the investigation of the power sites, their available heads and discharge of rivers throughout the country. It was begun in June of 1918 and appropriations have been made for its continuance through five years.



About 970,000 hp. in hydroelectric power is already generated in Japan and the present survey contemplates an additional 2,558,000 hp. possible of development. The above picture shows the 115,000-volt oil switches for the Inawashiro Hydroelectric Power Company near Tokyo, Japan, and is typical of the large scale on which these enterprises are being carried out.

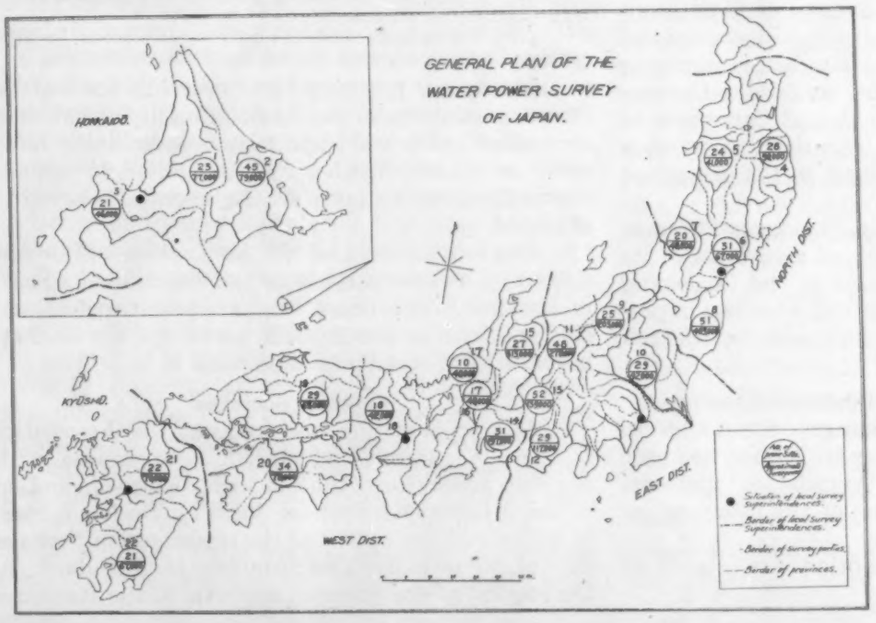
Organization and Plans —

The necessary regulations and general plan for the survey have already been formulated. An additional Water Power Section for superintending the survey has been added to the Bureau of Electrical Exploitation and five District Water Power Sections have been established. Some twenty-two survey parties have been carrying out the survey throughout the country. Some survey parties have completed their construction work of gauges, etc., and commenced the survey of the water-flows. Because of the extraordinary rise of wages and the price of material, especially the peculiar difficulties of the work in mountain and forest ranges, the survey was not a little prevented from rapid progress.

The program for the selection of the power sites and the establishment of gauging stations and the meteorological observatories, to be accomplished in the course of the reconnaissance, is given in the accompanying table and is to be completed by the end of September, 1919.

The Power Sites to be Surveyed —

The power sites to be surveyed by the Survey are those where more than 1,000 hp. at draft can be acquired by economical exploitation. In Japan, a little more than 1,000,000 hp. in water power is already utilized for the generating of electricity, and about 2,000,000 hp. is under lease for development, about half being already developed or in process thereof; while about 5,000,000 hp. has not yet been placed under exploitation, although it is estimated to be worthy of future economical development.



The water power survey of Japan as outlined in the contemplated plans. The upper figure in the circles represents the number of power sites to be located within the section indicated by the dotted lines. The lower figure is that of the approximate horsepower possible of development. This totals over two million — with possibilities of a still higher result when finally carried out.

PROGRAM OF WATER POWER INVESTIGATIONS

Name of District	Survey Party	No. River-Basins within the District	No. Rivers within the District	Power Sites to be selected within the District	Approx. Water Power at the Power Sites Draft Hp.	Average Hp.	No. Gauging Stations to be fixed A	B	C	Total	No. Meteorological Observatories to be fixed New	Old	Total
HOKKAIDO—	1st	1	12	23	77,000	175,000	3	5	4	12	10	11	21
	2nd	9	21	45	79,000	141,000	5	9	7	21	13	12	25
	3rd	7	8	21	46,000	85,000	4	3	3	10	5	8	13
	Total,	17	41	89	202,000	401,000	12	17	14	43	28	31	59
NORTHERN—	4th	8	13	28	50,000	97,000	4	5	2	11	5	16	21
	5th	5	13	24	41,000	82,000	6	5	5	16	7	25	32
	6th	2	13	31	67,000	134,000	5	7	3	15	6	27	33
	7th	3	9	20	48,000	98,000	5	4	1	10	3	23	26
	8th	6	23	51	403,000	912,000	6	9	3	18	14	22	36
	Total,	24	71	154	609,000	1,323,000	26	30	14	70	35	113	148
EASTERN—	9th	4	14	25	203,000	394,000	4	6	3	13	8	10	18
	10th	6	15	29	92,000	163,000	5	10	1	16	3	42	45
	11th	6	26	48	278,000	527,000	6	10	6	22	12	25	37
	12th	4	15	29	117,000	247,000	4	7	2	13	2	26	28
	13th	2	25	52	139,000	275,000	4	7	7	18	6	14	20
	Total,	22	95	183	829,000	1,606,000	23	40	19	82	31	117	148
WESTERN—	14th	3	15	31	197,000	391,000	5	5	3	13	5	30	35
	15th	4	13	27	313,000	619,000	4	7	3	14	7	18	25
	16th	1	6	17	48,000	119,000	2	5	2	9	1	16	17
	17th	3	8	10	40,000	86,000	2	4	2	8	1	16	17
	18th	8	12	18	42,000	97,000	5	5	1	11	10	63	73
	19th	12	20	29	63,000	136,000	6	13	2	21	16	57	73
	20th	9	22	34	78,000	179,000	6	8	5	19	14	34	48
	Total,	40	96	166	781,000	1,627,000	30	47	18	95	54	234	288
KYUSHU—	21st	8	14	22	70,000	133,000	4	8	4	16	8	33	41
	22nd	9	13	21	67,000	130,000	5	8	1	14	10	22	32
	Total,	17	27	43	137,000	263,000	9	16	5	30	18	55	73
Grand total		120	330	635	2,558,000	5,220,000	100	150	70	320	166	550	716

Establishing American Engineering Standards

(The importance of an established standard for the various elements of engineering work is not only of importance to the country itself, but greatly simplifies international relations and export conditions. A big step forward has been taken in the formation of an American Engineering Standards Committee through the national engineering societies in cooperation with the government. The details and aims of this organization are presented below.—The Editor.)

In many lines of engineering much excellent standardization work had been done before the war; the war emphasized its importance and showed most clearly the need of cooperation to prevent the confusion caused by the promulgation of overlapping standards by independent bodies. During the war the Government Departments coordinated these efforts in certain lines and greatly assisted in unifying them. The American Institute of Electrical Engineers, American Institute of Mining and Metallurgical Engineers, American Society of Civil Engineers, American Society of Mechanical Engineers and American Society for Testing Materials, recognizing the value of what had been done, invited the Government Departments of War, Navy and Commerce to appoint representatives to act with them to continue this work. The body so formed is the American Standards Committee.

The American Engineering Standards Committee has just completed and adopted a revision of its Constitution which has been sent to the Governing Boards of all the departments and societies represented on the Committee with a request for its ratification.

The American Engineering Standards Association

The new Constitution changes the name to American Engineering Standards Association, the change from "Committee" to "Association" more fittingly indicating the wide scope of the interests involved.

The objects of the Association are stated as follows:

1. To unify and simplify the methods of arriving at engineering standards, to secure cooperation between various organizations and to prevent duplication of standardization work;
2. To promulgate rules for the development and adoption of standards;
3. To receive and pass upon recommendations for standards submitted as provided in the Rules of Procedure, but not to initiate, define or develop the details of any particular standard;
4. To act as a means of intercommunication between organizations and individuals interested in the problems of standardization;
5. To give an international status to approved American engineering standards;
6. To cooperate with similar organizations in other countries and to promote international standardization.

Means are provided for increasing the number of representatives in the Association by invitation or on request. Several important organizations interested in standardization will be invited to appoint representatives as soon as the necessary power is obtained.

The routine work of the Association will be conducted by its secretary under the direction of a board of directors. This board will have power to deal with all the affairs of the Association except the final approval of the standards submitted to it.

Sponsor Societies

Any organization may request the Association to approve standards which it has formulated, or to approve committees that it has appointed, and by so doing becomes a Sponsor Society. Such a request is entirely at the option of the organization that has formulated or expects to formulate the standard. At the request of the Sponsor, approval of the standards

is given when they are the substantially unanimous conclusions of a committee made up as follows:

(a) Sectional Committees dealing with standards of a commercial character (specifications, shop practices, etc.) shall be made up of representatives of producers, consumers and general interests, no one of these interests to form a majority. A producer is a person, or the representative of a firm or corporation, directly concerned in the production of the commodity involved. A consumer is a person, or the representative of a firm or corporation, that uses the commodity involved, but is not directly concerned with its production. General interests include independent engineers, educators, and persons who are neither consumers nor producers, as defined above.

(b) Sectional Committees dealing with standards of a scientific or non-commercial character shall consist of persons specially qualified, without regard to their affiliations.

Methods of Procedure

It is anticipated that in nearly all cases the approval of standards and committees by the Association will be requested. In case it is considered advisable, the Association is authorized to call a meeting of those who would be interested in the formulation of a new standard or the revision of an old one, to select one or more Sponsor Societies. The Sponsor Society or Societies will appoint a Sectional Committee to formulate or revise the standard. This Sectional Committee will report to the Sponsor when its work is completed. The Sponsor may then request the Association to approve. The Association deals only with the Sponsor and acts only at its request. Provision is made in all publications that a standard must be referred to as that of the Sponsor, using whatever title the Sponsor has given it, followed by the statement "approved by the American Engineering Standards Association." The approval may be given in one of three ways, as: Recommended Practice, Tentative Standard, or Standard, the expectation being that nothing will be approved as Standard until it has shown that it is generally acceptable.

Scope of the Association's Work

The Association thus acts only to bring together those interested in a common object, and when they have completed their work, will at their request, certify that it has been done in such a manner as to justify its adoption. Nothing revolutionary is proposed; it is merely an extension of present practice. The Executive Committee of the American Society for Testing Materials now passes on the composition of committees, ascertains that their conclusions are substantially unanimous, and if so, reports them to the society for acceptance or rejection. The Association does the same for groups of organizations. Its Board of Directors performs the same functions as the Executive Committee of the American Society for Testing Materials, and the Association as a whole accepts or rejects. It neither selects Sponsors nor Sectional Committees; it does not consider the subject matter of a standard, nor the procedure under which it is arrived at, except that it requires sufficient information from the Sponsor to show that the conclusions are substantially unanimous and that the Sectional Committee is balanced and representative. It requires that in all publications the Sponsor shall be given full credit.

In addition to this work in assisting in the selection of committees and certifying that their work has been done under proper conditions, the Association will act as a bureau of information regarding standardization. It will collect information regarding existing standards and as to the bodies that have formulated and adopted them. This will enable it to promptly give necessary information to those who select a committee to formulate a new standard or revise an old one. It will also enable it to furnish information desired by the working committees regarding what has been or is being done on similar or related lines. It will establish relations with similar bodies in other countries and can do much to promote the acceptance of International Standards. It is possible to secure international acceptance of American Standards more easily through such a body than in any other way.

The Need for the Organization

With these fundamental restrictions of its activities it may be asked whether there is sufficient reason for the existence of the Association. This naturally has been carefully considered and it is the unanimous conclusion of the committee and of all of those who have been consulted who have been active in standardization work, that such an organization is urgently needed. The American Engineering Standards Association will furnish a means by which any organization intending to define a standard can readily ascertain what others are interested, and should be consulted in regard to it. At present there is no such means. There is nowhere anything approaching a complete list of the organizations doing standardization work, much less any list of the standards purposed or in preparation. The enormous advantage of having any standard generally accepted, and the much greater probability of accomplishing this if it is prepared under definite conditions that have proved effective in the past, will, it is believed, cause most of the organizations engaged in such work to ask and receive the assistance of the American Engineering Standards Association. It provides definite machinery for securing cooperation and preventing duplication of work. It establishes definite rules securing the absolute autonomy of any group engaged in the development of standards and insures that this group shall receive full credit for its work.

With the assurances of cooperation that the American Engineering Standards Association has already received, it is believed that there is no question of the advisability of forming the more broadly representative Association.

NEW CABLE TO JAPAN

A plan to lay another cable between Japan and the United States is making headway.

The Japanese government and influential business men, who are expected to finance the undertaking, are giving the project warm support.

The increase of words handled on the Pacific cable during the past few years shows a yearly proportionate increase of about 35 per cent. In 1918 about 5,000,000 words were carried.

Making a Success of an Electrical Store

BY HUGH W. KIMBALL

(What makes for success in retailing? Some principles which are the result of practical experience are here set forth, including a discussion of the relative merits of goods with large discounts which leave the advertising to the dealer, and nationally advertised goods. The importance of store location, store arrangement and the checking up of expenses is also dealt with. The paper was presented at the recent Santa Cruz Convention of Contractor-Dealers. The author is proprietor of the Kimball Electric Company of Oakland, California.—The Editor.)

Electrical retailers must all realize that they are promoting a business which though similar to other industries, is in itself in the position of an infant industry when its size and scope are taken into consideration.

Importance of Store Location —

I consider the most important factor pertaining to an electrical retailer is store location, and I would have no hesitancy in making a lease that might involve five or six thousand dollars a year for proper location. Electrical retailing is here. The public are interested, and we have just as good right to take the best locations and operate them successfully, as any other retail industry in that respect.

In studying this problem I have done considerable investigation and have talked with retail merchants of various lines. I find that the general opinion is that four per cent of the gross volume of business is not in any respect an excessive rent to pay for the proper location, and until such time as we realize the fact of the importance of location, we shall not become an active necessary adjunct to the distribution of electrical retail supplies. We find that household supply stores, hardware stores, furniture houses and department stores are reaping a large volume of this business and in reality are real competitors. Store location is the reason.

Advertising —

The second factor of electrical retailing in importance is advertising, and in conjunction with proper location, advertising must be done. The amount of money that might be spent in this respect varies according to the product being sold, of course, but after considerable observation I am satisfied that an electrical retail store is entitled to spend an amount equivalent to four per cent of its gross sales for advertising purposes.

A great deal has been said by our manufacturers' agents and jobbers in regard to national advertising. I feel that the intricate details in the management necessarily surrounding a manufacturer's business (this also applies just as truly to jobbers) are in no respect suited to the successful conduct of retail merchandising. A manufacturer selling to the consumer is too much like government control or ownership of public utilities. It tends to eliminate a large class of alert, resourceful and energetic salesmen and thus kills the strongest selling force—that of constant personal contact with the public.

SELLING THROUGH STORE ARRANGEMENT

The display of electric ware in the store should always be such as to make such apparatus appear simple of operation, not to mystify. Lamps should be sold well back in the store, to bring customers past other displays and, if they purchase nothing further, to make them at home in the store. The farthest counter, in Mr. Kimball's effective store arrangement here shown, is the one where lamps are sold.

FOLLOWING UP NEWSPAPER ADVERTISING

By a newspaper advertising campaign on washing machines, backed up by active window displays, sales of this product were practically trebled in a two weeks period over the fourteen days just preceding the sale. Note that mazda lamps are always featured in the window, although not in a way to detract from the main display.

National or Local? —

National or general advertising is admitted to be a necessary adjunct to the marketing of a product, but in proportion as it eliminates the retail dealer it becomes of less selling value, and consequently less a part of this great service to the public that we hear so much about. I wish to substantiate this statement which I have just made by examples of products which my firm is handling. We are fortunate in having the exclusive sales right on a very fine electric cleaner. The manufacturers of this product do no advertising, local or national, and the only advertising service we have from them consists of stereotype folders, which they send us free of charge

for mailing purposes. Their discounts, however, for handling their product are larger than in any other line which we handle, with the result that we are in a position to spend more money advertising this product directly to the consumer than we are with any other line we carry. It is more to our advantage to advertise our own company and this product than it would be if they spent ten times the amount we spend, in national advertising. We sell this product because it is recommended by those who are already using it, and we find it far easier to sell on the recommendation of satisfied customers, coupled with our own local advertising, than to sell those products which are extensively advertised in such magazines as the Saturday Evening Post, Collier's and others.

Eliminating the expense of national advertising, the manufacturer of this product is in a position to give us better discounts and we in turn are in a position to render better service by local advertising that nets more to us than products handled under national advertising done by the manufacturer.

What Advertising Will Do —

After varied experiences we have found that newspaper advertising has better direct results than any other form, and therefore it is profitable to do more in newspaper advertising than it might be in any general schemes upon which we might determine. We keep our appliance sales, that is, the sale of washing machines and vacuum cleaners, separate from general store sales. Earlier in this year we determined to make an extensive drive on the sale of washing machines. This drive started on February 15th of this year. From February 1st to February 15th we did not do any advertising in the newspapers and very little display work in the store. Our sales for the first fifteen days of February amounted to $1,314.55. From February 15th to February 28th, inclusive, we spent in newspaper advertising $429.40 and kept an active display of washing machines in operation in a laundry in one of our large windows at an expense of approximately $75.00 for the one-half month. With this advertising we increased our sales from the figure just given to that of $3,648.24 for the last twelve days of the month, or approximately three times as much as we did the first fifteen days of the month.

The distribution of folders supplied by the manufacturer, not only given over the counter but through the mail with statements and correspondence, has a splendid return.

Store Arrangement —

If you have the proper location, backed by proper advertising, the next most important factor, and one that must be seriously considered, is store arrangement. I am a strong advocate of active electrical displays, because they not only attract the eye of the public but show the simplicity of electrical operations. In the past it has been the tendency of the public to be afraid of electrical apparatus; there is something about it they do not understand. We have made a mistake in the past of having displays of electrical equipment which are a puzzle to those who view them. We should guard ourselves against investing the actions of this wonderful element with mystery, because in reality it is simplicity itself, and the easier it becomes for the user to understand its action, the more it will be used.

Mazda Lamps and General Sales —

I want to mention at this time that the greatest call upon the electrical retailer is for Mazda lamps. We have found it profitable always to keep a well arranged display of Mazda lamps in our window. When we first equipped our present store, for convenience' sake we placed our lamp counter just inside the main entrance, and we found that the greatest number of customers who came into our store came for the purpose of buying Mazda lamps. They would come to this counter, obtain the lamps and leave without really getting into the rest of the store. Recently at considerable expense we placed this counter at the extreme rear end of the store, making it necessary for customers coming in for lamps to pass through the displays of our other departments. They really got into our store, and the result has proven to us that it was well worth the expense. I would advise that all retail dealers have their lamps as far inside their store as possible, as there are more customers calling for lamps than for all other purchases put together.

Handling Time Payments —

It was with considerable trepidation that we entered into the sale of vacuum cleaners and washing machines on the long time payment plan—that is, ten per cent down and ten per cent per month. I felt that we were facing a plan of collections which in itself was serious; but after a year's experience, I am in a position to state that the collections, properly handled, are very simple.

Our contract forms for the sale of this product specify that the payments are to be made at the office of the company, giving the street address. Our salesmen call the customer's particular attention to the fact that we do not send out a collector. We have found that after the second payment has been made on time all other payments are very apt to be made. If not, we sent out a notice that their payment is due at our office at a given date. We absolutely refuse to accept money on any contracts made outside of our own establishment. If for any purpose, the manager of this department or his assistants call upon a customer who is in arrears, they are absolutely forbidden to accept money on account. But the only time we call on customers for collection purposes is when we call to take away the product which they have leased.

The coming of these customers to our store for the purpose of making their payments is a big asset. It gives our sales people and the manager of our retail department an opportunity to get in touch with them, which often results in the sale of other products. We have a buzzer in the cashier's office specially for the purpose of calling the store manager when people come to make their payments.

Analysis of Business —

In analyzing overhead against the gross profit we have found in the past that the sale of retail materials generally in the store, not including the

sale of vacuum cleaners and washing machines, bears an overhead of 24%, whereas our average gross profit is 30%, leaving only 6% net profit, which is considered insufficient. Most retail merchants expect to get 15% net on their sales. This stock bears an average turnover of six times per year, including the sale of Mazda lamps which, of course, as far as the retail merchant is concerned, in reality has no turnover, as it is consigned stock. On the other hand, such an item as art portables bears a turnover of not less than one and a half times annually.

In our store we have found that the sales expense pertaining to vacuum cleaners and washing machines is higher than that of any other retail business. Our sales expense for the year of 1918 amounted to 32½%, divided approximately as follows:—

Sales expense	16%
Advertising	4%
Rent	2%
Contingent fund	1%
Office expense (allowed)	2%
Electric appliance maintenance	2%
Delivery	1½%
General administrative	4%
Total	32½%

The largest item on the list is that of sales expense based on what a good outside salesman will cost and what he should produce. We have found that our best salesmen dispose of approximately $1000 in merchandise per month. Such a man will not work for less than $150 to $200 per month. Our actual commission paid on aggregate sales amounted in 1918 to 16%, and as you can see, a man selling $1000 worth of goods per month would receive an income of $160, which is none too much.

Since the first of January, 1919, we have been able to reduce this expense in various places to approximately 30%, on account of increased volume; but even with a business of $75,000, which we expect to do in this department this year, we cannot see how this expense can be further reduced. With the popular discount of 25% on such articles it is really impossible for a retail merchant to make money, and unless he can find a better discount he would be handling such business at a loss.

Analysis of turnover, overhead, and investment should not end with a general analysis. The stock should be segregated as far as possible and individual analysis made on specific lines. For example, our actual turnover on washing machines and vacuum cleaners stock is very high—I should say twenty-four times a year—whereas on the smaller socket devices, due to the necessity of carrying a large display, our turnover averages approximately four times per year.

Standardized Accounting System

(The recent endorsement of the Bureau of Education and Research of the National Electrical Contractors and Dealers' Association by the representatives of manufacturers, jobbers and central stations, means that the organization's work of bettering contractor-dealer business methods will be carried to a wider field. The standardized system of accounting which is here briefed from the report of the N. E. C. D. Association deserves general adoption by all engaged in the electrical business. The Journal of Electricity hopes at an early date to offer a series of articles which will aid in the adapting of these principles to simple business concerns.—The Editor.)

Every contractor and dealer intending to follow the system of accounting adopted by the National Electrical Contractors and Dealers' Association should familiarize himself with the six cardinal principles of accounting as laid down by the Accounting Committee of the Association of Electrical Manufacturers' Council (National Electrical Manufacturers' Association) and the Electrical Supply Jobbers' Association. These are as follows:

1. **All forms should be standardized.**
2. **All sales, whether contract, jobbing, day work, or retail, should be costed.**
3. **A merchandising account should be created through debit entries for purchases and credit entries at cost for materials sold in any way.**
4. **A general ledger containing all controlling accounts should be made a part of this system.**
5. **All liabilities should be vouchered each month irrespective of receipt of goods or correctness of invoice. Provision should be made for charging vendors for any errors or discrepancies in bills.**
6. **Cash book should combine bank records, both receipts and payments, that debit entries equalizing bank deposits for the month and credit entries equalizing charges to bank balance. The cash book should not be used for distribution.**

Necessary Steps in Starting the System —

Present books should be closed, the same as at the end of any fiscal year, and a trial balance obtained, including physical inventory of merchandise, tools, and office appliance, on hand.

The respective items in the trial balance should then be transferred to the proper accounts designated in the new trial balance sheet furnished, and corresponding accounts opened in the new general ledger in the same sequence as the various accounts appear in the trial balance book.

Care should be exercised in changing former divisions of asset and liability accounts, also expense account, so that they will agree with the divisions outlined in these instructions, as it is essential that all members have the same viewpoint in the classification of assets and liabilities and those affecting the operation of their business.

Forms and Directions —

Only eighteen forms are necessary to the operation of this uniform accounting system. They are named in the key chart. These records, it is believed, provide a simple, accurate, and flexible accounting system for the average electrical contractor-dealer. The contractor and the contractor-dealer will use all of the forms, but the dealer who does a retail business exclusively will not need the first five forms. Central stations electric shops that are organized on a departmental and profit-making basis, as they should be, will also be able to adapt this system to their needs. The value of a uniform accounting system to the retail trade will, of course, be most largely conserved if those who install the system hold down the variations from it to the smallest possible number.

Form 1—Requisition of Material —

When an order for contracting work has been received from a customer naturally one of the first forms to be made out is a requisition for material. This form is necessary whether the shipment is from stock or from the vendor direct to the job. The form provides for this notation. However,

it must be remembered it is an office form and not a purchase requisition. At the same time that a job is opened with this form, the job envelope (No. 4) should also be opened. The requisition for material should be costed each day and filed in the envelope. If it is necessary to keep a separate stock record, a duplicate will serve this purpose, permitting the original to go into the job envelope. Where material is shipped direct from vendor to job, duplicate or order sent to vendor should be placed in job envelope and costed to take the place of Form 1.

Form 2—Time Card —

The time card is to be made out by the workman and turned in by him each day. The card should be filed under the workman's name so that all his cards are already assembled when computing his pay for the week. Before his card is filed, however, a separate card should be made out for each job listed on the workman's card. These cards are then to be filed in their respective job envelopes. The workman may not know the job number, but he certainly knows the name and address. The office or bookkeeper can then fill in the job number.

Form 3—Returned Material Record —

Whenever any material is returned from a job a returned material record is to be made out, listing the quantity and kind of material returned. The workman, or whoever checks the returning material, can fill in all of the form excepting the cost column. The form is then turned over to the bookkeeper, who will cost the material and then file the card in the proper job envelope.

Form 4—Job Envelope —

The job envelope is intended to contain all of the records of material, labor, and direct job expense after costing. As the job progresses all of the information should be entered on this form printed on the front of the envelope. The sum of material total, labor total, and expense total will give the actual total direct cost of the job. To this figure there must be added, of course, a percentage for overhead, and a percentage for profit when billing the customer. The information as to material, labor and direct job expense should be transferred to the duplicate of the customer's bill. The envelope should be filed numerically in the job envelope file.

Form 5—Material Summary Sheet —

The Material Sheet Summary is intended to supply a long-felt need in the electrical contractor's accounting. Its purpose is to assist the contractor in assembling various types of material shipped, especially on day work, that is "time" and "material" jobs, so that a condensed billing can be made quickly and accurately on completion of the work.

With this form it is necessary to write down the name of an article only once (unless there are more than five requisitions of it) and against it can be indicated the date, the amount of material issued, the total issued, any return, the total chargeable, the unit cost, the total cost and the selling price.

The final figure on material on each requisition is to be entered in the column of the same name on the job envelope. This summary sheet is to be filled in progressively, that is, whenever material goes out on a job.

Form 6—Charge Sales Ticket —

No one form has been designed in this system for a charge sales ticket. This ticket will vary according to the use of a cash register, duplicating sales register, or sales book. Whatever kind of ticket is used, provision should be made for obtaining cost on this type of sale.

Form 7—Cash Sales Ticket —

No one form of cash sales ticket is recommended. Explanation and instruction for charge sales ticket holds good for this one, too.

Form 8—Bill to Customer —

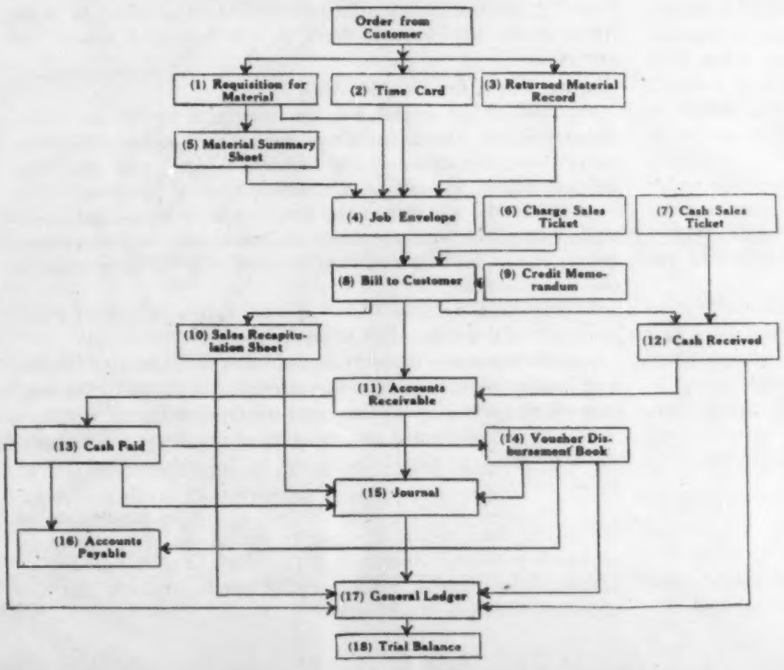
No one form of bill is recommended. All bills should be made in duplicate. Use plain paper for the duplicate. The bill and duplicate will carry the job number and also a consecutive bill number. The duplicate is to be filed according to the consecutive number in a standard binder, from which postings are made direct to the sales ledger, that is "Accounts Receivable." The number on the duplicate is to be used as the folio number in the sales ledger column.

Form 9—Credit Memorandum —

No one form of credit memorandum is recommended. Forms in duplicate should be provided for sending credit memoranda to customers, covering any allowances or adjustments. The duplicates are to be retained in a designated binder. The cost, as to material, labor and direct job expense of such credits is to be duly recorded in the duplicate.

Form 10—Sales Recapitulation Sheet —

Progressively during the month the amounts of bills rendered, together with the cost, should be entered on the



This chart shows the slips, cards, envelope tickets, bills, sheets and loose leaf pages used in the accounting system. For convenience all these records are called forms. The names of all the forms are given and the number in each panel refers to the description of the actual form as given in the text. The lines connecting the forms indicate the sequence of the accounting operations or the way in which business flows through the accounts in the system.

sales recapitulation sheet, which is a recapitulation of amount of sales (i. e., contract sales, and time and material sales), amount of lamp sales, amount of store sales, and the cost of these sales. At the end of the month the form will furnish the total sales with cost separated as to material, labor and direct job expense. These respective totals will be used in closing journal entries monthly, as explained later under "Closing the Books for the Month."

Form 11—Accounts Receivable —

The Accounts Receivable sheet is a simple form of sales ledger page, with debit, credit and balance columns, but if the particular business of any contractor necessitates a different form of sales ledger sheet, such a sheet, of course, can be substituted.

Form 12—Cash Received —

Enter all receipts from customers' payments in "Accounts Receivable" column, and discount deducted under "Cash Discount Allowed."

All receipts other than those affecting "Accounts Receivable" are to be entered in the column headed "General Ledger" and posted direct to the credit of the respective accounts in the general ledger.

Cash sales in total are to be recorded daily in the column provided.

In the columns marked "Bank" should be entered all deposits made in the banks. These deposits should equal the total receipts for the day.

Form 13—Cash Paid —

All payments, of whatever nature, are to be entered in column marked "Accounts Payable" and the discount obtained under "Discount Earned." Columns are provided under "Bank" in which should be entered all payments at net amount, on the same lines as the entry to "Accounts Payable," so that at the end of each month the total payments, less discounts, should equal the totals of withdrawals from the banks. All checks should be entered in the "Accounts Payable" column for the gross amounts of invoices. Discount is entered in "Discount Earned" column, and the net amount of the check in "Bank" column.

The sheet is placed in the same binder as the "Cash Received" sheet. On both "Cash Received" and "Cash Paid" sheets provision is made for two bank accounts, and on the latter sheet are columns for balances.

Form 14—Voucher Disbursement Book —

All indebtedness of whatever nature, whether merchandise, labor, direct job expense or overhead, should be assembled under the name of the vendor in the Voucher Disbursement Book, totaled and posted once each month when bills become due on a discount basis, to the credit of such vendor's account in "Accounts Payable" column. These bills are to be provided with consecutive voucher numbers, which are to be recorded in the column provided.

In order to obtain an analysis of the entries made under "Accounts Payable" column and to provide the proper debit entries, enter on the same line as recorded in "Accounts Payable" column the distribution of the amount credited to the vendor.

Columns from "Merchandise" to "Miscellaneous" are to be totaled at the end of the month and posted to the debit side of the account of the same name in the general ledger. Disbursements to "General Ledger" columns are to be posted to the debit of the respective accounts in the general ledger. The entries to "Accounts Payable" column are to be posted to the credit of the respective accounts in the Accounts Payable ledger.

For all overhead charges columned in this form, separate accounts should be opened in the general ledger for those omitted.

Debit distribution of all vouchers for which specific columns are not provided should be entered in "General Ledger" column and posted directly. There are a great many entries, such as rent, insurance, and other expenditures incurred so infrequently that it is not necessary to provide disbursing columns in this book, and these are to be entered in the "General Lodger" column as the items are vouchered to accounts payable.

It is recommended that a Petty Cash account be kept, to be started on the following basis:

Draw voucher and give to bookkeeper sufficient amount to take care of small cash expenditures for express and expense items for fifteen days. As the bookkeeper or cashier wishes to replenish the cash on hand, voucher the receipts held for expenditures in voucher disbursement book to credit of Accounts Payable—"Petty Cash Account"—and debit to respective expense columns in same book.

Check is then drawn to order of Petty Cash, and to cover such voucher and money turned over to the bookkeeper. Receipts from Cash sales or other sources must be deposited in bank and not confused with Petty Cash money.

Form 15—Journal —

The Journal is to be used for all transfers from debit to credit of any accounts receivable and accounts payable, or general ledger.

Certain closing entries at the end of each month are also to be made through the Journal, as explained later in "Closing the Books for the Month."

Individual items entered during the month under either debit or credit of the respective column should be posted directly to the various accounts in each book with the exception of the "Merchandise" column (both debit and credit) which can be totaled at the end of the month and posted in one entry to "Merchandise" account.

Form 16—Accounts Payable —

Credit entries are obtainable from "Accounts Payable" column in the voucher disbursement book, and debit entries from the "Accounts Payable" column in the cash book. This is a loose leaf form.

Form 17—General Ledger —

The general ledger provided is a bound book, with debit, credit, and balance columns.

Full instructions for opening of the accounts and entries have been given above.

Form 18—Trial Balance —

When starting the new system a trial balance should be obtained, and at the end of the month totals are copied from the general ledger, the accounts corresponding to those listed in the trial-balance book, in which printed spaces are provided.

Closing Books for the Month —

Closing the books for the month involves the Sales Recapitulation Sheet, the Cash Book, the Voucher Disbursement Book, the Journal, the General Ledger, and the Trial Balance Sheet, as well as the Summary of Operations.

When the columns of the first five have been totaled and posted to their various accounts, accounts in the general ledger should be balanced, and entered in the proper place in the balance sheet.

The trial balance sheet covers Assets, Liabilities and Accounts under Summary of Operations.

The balances from "General Ledger" accounts should be transferred to the respective accounts as listed in the trial balance sheet and under Summary of Operations.

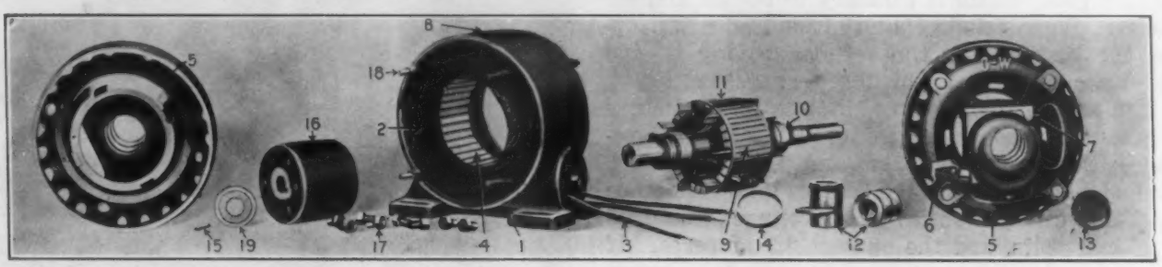
The accounts are all designated in the trial balance sheet as debit or credit as an aid to the proper analysis of these accounts.

The trial balance sheet should prove, of course, as to debits and credits, and a separate statement then should be prepared covering Assets and Liabilities and Summary of Financial Operations, both for the current month and the cumulative period of the year.

PRACTICAL LESSONS IN ELECTRICITY

BY H. H. BLISS

(The man who sells as well as the man who uses electric motors will have the hows and whys of their construction and operation made clear by the following exposition. This is the tenth of a series of articles especially designed to meet the needs of the man who desires more intelligently to deal with the various types of electric apparatus. Supplemental material is furnished by the Extension Divisions of the Universities of California and Oregon, in cooperation with whom this course is run.—The Editor.)



Note the simplicity of this small induction motor. Part 4 is the stator with windings shown at 2 inserted in slots on the inner face. Part 9 is the rotor of the "squirrel cage" type with simple copper bars for inductors

ELECTRIC MOTORS

Theory of Motor Action.—Oersted in 1819, laid the foundation of the modern electric motor when he discovered that current in a wire affected a nearby compass needle. He showed that the electricity tends to cause the movement of a magnet pole in a circle around the conductor. In Fig. 1, for instance, the current in wire A exerts a force upon the nearby north pole, trying to make it move upward, then to the right, then downward. A south pole would tend to circle the wire in the opposite direction.

Direct current motors are built with stationary poles, so that the wires themselves are made to

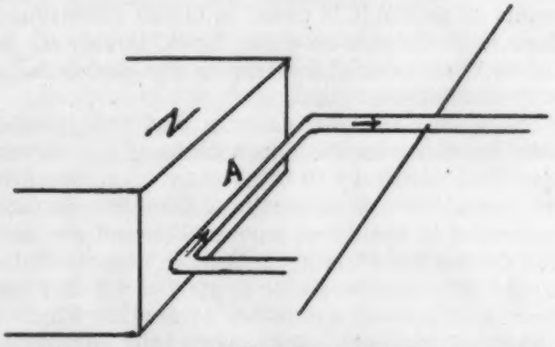


Fig. 1.—Current in Wire A tends to force the north pole upward. The reaction drives the wire itself downward.

move, just as a man trying to push a piano across a room may drive himself backward. Then in Fig. 1, wire A moves downward and the wire adjacent to a south pole moves upward. One can always determine the direction by remembering the old **Right Hand Rule:** Grasp the wire with the thumb pointing along it in the direction of current flow; then a north pole will follow the fingers around the wire.

The armature of a motor is built of laminated iron with slots for the conductors. (See Fig. 2.) The commutator of a d.c. machine acts to keep the current always flowing in the same direction in the vicinity of any pole. In Fig. 2 it flows **"out"** (toward the observer) beside the north pole as indicated by the dots (arrow points); it flows **"in"** (into the paper) beside the south pole as shown by the (+) marks (arrow feathers).

If an armature such as that in Fig. 1 is supplied with an alternating current which reverses exactly "in step" with the rotation, so that current flows **"in"** along the other wire when that is beside the north pole, the machine will run and carry a load. This is the principle of the "synchronous motor."

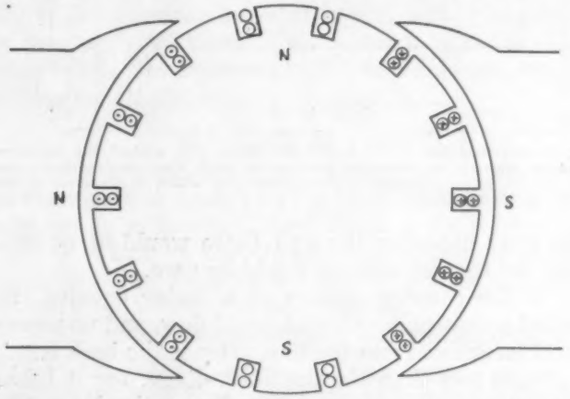


Fig. 2.—A motor armature. The currents in the wires may be thought of as producing poles in the armature iron which are attracted and repelled by the field poles.

It follows that any electric generator will operate as a motor if supplied with current under proper conditions.

Another way to study the action of a motor is to think of the armature as an electromagnet. The coils in Fig. 2 tend to produce a north pole at the top of the armature and a south pole below. These are pulled and pushed by the field magnets according to the rule: Unlike poles attract and like poles repel each other. As the armature rotates, its poles continually shift through the metal and keep in their positions at the top and bottom, because the wires

at the right are always carrying current **in** while those at the left carry it **out.**

Counter Electromotive Force. — In a rotating motor armature the wires are passing at high speed through lines of force. This must set up a voltage in these wires, whether they carry current or not, for an e.m.f. is **always** induced in a conductor being cut by lines of force. This voltage may either help or hinder the current flow; if it helps, there will be more current and more magnetic force the faster the armature goes, which is contrary to reason and experience. We conclude that the induced e.m.f. opposes the current and the voltage driving it, and name it "counter e.m.f." or "back e.m.f."

The number of amperes through the armature depends, then, upon three things: the armature resistance, the applied voltage, and the back e.m.f. If we had a battery circuit of 2 ohms total resistance with 6 dry cells in series, the voltage would be $6 \times 1.5 = 9$ volts, and the current 4.5 amperes. If one of the cells were connected backward, however, the effective voltage would be $7.5 - 1.5$ or 6 volts, and the current 3 amperes. With two cells connected backward we should obtain 1.5 amperes. If three

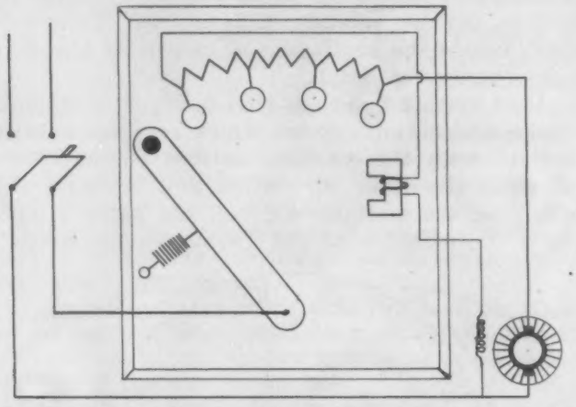


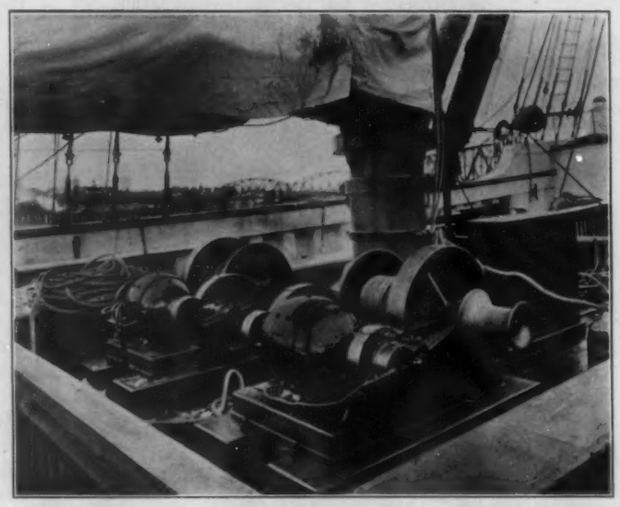
Fig. 3.—Starting box for a d.c. shunt motor. To protect the armature winding, when it is producing little or no back electromotive force, the line current is sent through a series resistance which is decreased as the motor speeds up.

cells were opposing the rest there would be no current, for the net voltage would be zero.

If the counter voltage of a motor equaled the applied pressure, no current could flow, and no power would be drawn from the line. Hence the back e.m.f. is always less than the applied voltage, for it takes power to run a motor, even when unloaded. **The armature current = (applied volts — back e.m.f.) ÷ armature ohms.**

Motor Starting. — When an armature is stationary it cannot produce any counter e.m.f. If the full voltage were applied a very heavy current would flow, and for the protection of the windings it is customary to provide some sort of starting apparatus which limits the current to a safe value. Direct current shunt motors (which are wound the same as shunt generators) are started with a variable resistance in series with the armature, as shown in Fig. 3. By means of a sliding contact the resistance is lowered step by step as the motor gains speed, and it is all out when full speed is nearly reached.

Alternating current motors are often started by applying pressure less than the normal line voltage. "Compensators" which are "step down transformers" are connected to the line and supply current at low voltage during the starting period. In other cases resistance is introduced into some of the motor circuits, while sometimes the connections of the coils are changed temporarily to produce effects equivalent to changing from parallel to series circuits.



Direct current motors of 15 hp. each drive these deck winches. What is the current input to one of the 116-volt motors when a load of 25000 lbs. is being hoisted 3 ft. per sec. if the overall efficiency of the machinery is 55%?

Alternating Current Motors.—Synchronous motors are used when it is desired to operate machinery at a speed exactly proportional to that of the generators supplying the current.

For driving the d.c. generators for electric railways and in other applications requiring large amounts of power it is usual to install synchronous motors in preference to other types, largely on account of their beneficial effect on the power factor of the transmission line.

Since they can not carry a load except when exactly in step with the alternations of the current supply, it is necessary to bring them up to speed by some special device. Sometimes the d.c. generator is connected to the direct current line and run as a motor during the starting period; in other installations the synchronous motor is started without load by means of a small a.c. motor of another kind.

For all ordinary applications, the "induction motor" is most widely used. The construction is simple, cheap and rugged, and operation and maintenance are easy and inexpensive. The typical motor of this type has no sliding contacts and only the simplest elements of a winding upon the revolving part or "rotor."

Alternating currents in coils wound about portions of the iron "stator" (stationary part) of an induction motor produce magnetic poles which are north when the current flows one way and south when it reverses. Other poles of opposite polarity are produced between these by coils wound in the opposite direction. The result is that north poles appear at several points around the stator and shortly

after (when the current has reversed) they appear in different places. By the use of two or more alternating currents which reverse at different times there is produced a smooth progression of the poles around the inside of the stator, and this is known as the "revolving field."

Just as in the alternating generator, the wires near the poles of a revolving field are cut by the moving lines of force and have e.m.f. induced in them. Thus the conductors of the rotor, which are short circuited upon each other, carry heavy induced currents, but no electrical contact with the supply circuit is needed. The reaction between these induced currents and the magnet poles of the stator causes the rotor to turn. As it gains speed it almost catches up with the revolving field but it never runs quite as fast. If it did, there would be no more induction of e.m.f. on the rotor, for each wire would keep beside some pole and there could be no cutting of the inductors by lines of force. The difference between the speeds of the rotor and the revolving field is known as the "slip," and this varies whenever the load is changed.

General Lighting Safety Orders

(After several public hearings the Industrial Accident Commission has issued its General Lighting Safety Orders under the Workmen's Compensation Insurance and Safety Act. The principles of industrial lighting and the Safety Orders, extracts from which are reprinted below, were compiled by a committee of experts representing various interests, and will be adopted by the Commission, with a few minor alterations, at an early date.—The Editor.)

PRINCIPLES OF GOOD LIGHTING

Advantages of good light.—While the necessity of good natural and artificial light is so evident that a list of its effects may seem commonplace, these same effects are of such great importance in their relation to factory and mill management, that they are well worth careful attention. The effects of good light, both natural and artificial, and of bright and cheerful interior surroundings, include the following items:

1. Reduction of accidents.
2. Greater accuracy in workmanship.
3. Increased production for the same labor cost.
4. Less eyestrain.
5. Promote better working and living conditions.
6. Greater contentment of the workmen.
7. More order and neatness in the plant.
8. Supervision of the men made easier.

In this list it will be noted that items 4, 5, 6, 7 and 8 all have a bearing on accident prevention.

In view of the fact that resulting advantages of superior illumination on increased output are apt greatly to exceed economies in operation cost as regards the lighting system, it is a distinct advantage to direct and hold the attention on the former rather than on the latter.

While it is desirable to have adequate light over the working areas, it is absolutely essential for the proper results to eliminate or minimize the light which otherwise would pass directly from the lamps to the eyes of the workers; that is, one must avoid glare which is not only fatiguing to the eye but also conducive to the incorrect estimation of sizes and locations of objects in the field of view.

A. Daylight

Adequate daylight facilities through large window areas, together with light, cheerful surroundings, are highly desirable and necessary features in every work place, and they should be supplied through the necessary channels not only from the humane standpoint, but also from the point of view of maximum plant efficiency. The following requirements may be listed for natural lighting:

1. The light should be adequate for each employe.
2. The windows should be so spaced and located that daylight conditions are fairly uniform over the working area.
3. The intensities of daylight should be such that artificial light will be required only during those portions of the day when it would naturally be considered necessary.
4. The windows should provide a quality of daylight which will avoid a glare due to the sun's rays and light from the sky shining directly into the eye, or where this does not prove to be the case at all parts of the day, window shades or other means should be available to make this end possible.
5. Ceilings and upper portions of walls should be maintained a light color to increase the effectiveness of the lighting facilities from window areas. The lower portions of walls should be somewhat darker in tone to render the lighting restful to the eye. Factory green or other medium colors may be used to good effect.

In all the work of providing natural light, it should be kept in mind that direct sunshine in itself, from the illumination standpoint, but irrespective of sanitary conditions, is not wanted. The idea that sunshine is the important item is a common but an erroneous impression.

B. Artificial Light

It is evident that the introduction of the many new lamps has made possible what may be termed a new era in industrial illumination, a distinctive feature of which is the scientific installation of the lighting units, suiting each to the location and class of work for which it is best adapted.

The general requirements for artificial lighting are as follows:

1. Sufficient illumination should usually be provided for each workman irrespective of his position on the floor space.
2. The lamps should be installed and selected so as to avoid eyestrain to the workmen.
3. The lamps should be operated from sources of supply which will insure reliable illumination results, particularly on account of the demoralizing effect by intermittent service, just when the light may be most needed.
4. Adequate illumination should be provided from overhead lamps so that sharp shadows may be prevented as much as possible, and in such measure that individual lamps close to the work may be unnecessary except in special cases.
5. The type and size of lamp should be adapted to the particular ceiling height and class of work in question.
6. In addition to the illumination provided by overhead lamps, individual lamps should be placed close to the work if they are absolutely necessary in the eyes of a lighting expert, and in such cases the lamps should be provided with suitable opaque reflectors.

LIGHTING SAFETY ORDERS

(a) Windows, skylights or other roof-lighting construction of buildings shall be arranged with the glass area so apportioned that the darkest part of any working space, when normal exterior daylight conditions obtain (sky brightness of 1.50 candlepower per square inch) there will be available a minimum intensity equal to twice that of Order 1503, otherwise artificial light of intensities specified in Order 1503 shall be provided.

(b) Awnings, shades, diffusive or refractive window glass shall be used for the purpose of improving daylight conditions or for the avoidance of eyestrain wherever the location of the work is such that the worker must face large window areas through which excessively bright light may at times enter the building.

Note.—The intensity requirements for adequate day lighting are much higher than those for adequate night lighting, because in general under daylight conditions the light reaching the eye from all surroundings in the field of vision is much brighter than at night, and hence a correspondingly more intense light must fall on the object viewed.

Order 1503. **Artificial Light —**

(a) When the natural light is less than twice the minimum permissible intensities of illumination set forth in the following table, artificial light shall be supplied and maintained in accordance with the table.

		Foot-candles at the floor level
1.	Roadways and yard thoroughfares	0.02
2.	Storage spaces, stairs, stairways, halls, hallways,, passageways, aisles, exits and elevator entrances	0.25
3.	Water-closet compartments, toilet rooms, washrooms, dressing rooms and elevator cars	0.50
		Foot-candles at the work
4.	Work not requiring discrimination of detail, such as handling material of a coarse nature, and performing operations not requiring close visual application	0.50
5.	Rough manufacturing requiring discrimination of detail, such as rough machining, rough assembling, rough bench work, also work in basements of mercantile establishments requiring discrimination of detail	1.00
6.	Rough manufacturing requiring closer discrimination of detail, such as machining, assembly and bench work, also work in basements of mercantile establishments requiring closer discrimination of detail, intermediate between 5 and 7	2.00
7.	Fine manufacturing, such as fine lathe work, pattern and tool making, also office work, such as accounting and typewriting	3.00
8.	Special cases of fine work, such as watchmaking, engraving and drafting	5.00
9.	Processes otherwise safeguarded in which light is detrimental	0.00

Order 1505. **Shading of Lamps for Overhead Lighting —**

(a) Lamps suspended at elevations above eye-level less than one-quarter their distance from any positions at which work is performed, or where places are traversed, must be shaded in such a manner that the intensity of the brightest one-quarter square inch of visible light source shall not exceed seventy-five candle power per square inch.

Lamps suspended at elevations greater than twenty feet above the floor are not subject to this requirement.

Order 1506. **Shading of Lamps for Local Lighting**

(a) Lamps for local lighting must be shaded in such a manner that the intensity of the brightest square inch presented to view from any position at which work is performed, shall not exceed three candle power.

Note.—In the case of lamps used for local lighting, at or near eye level, the limits of permissible brightness are much lower than for lamps used for overhead lighting, because the eyes are more sensitive to strong light received from below, and because such light sources are more constantly in the field of view.

Order 1508. **Emergency Lighting —**

(a) Emergency lights shall be provided in all work-space aisles, stairways, passageways, exits, outside landings of fire escapes and other structures, used as regular or emergency means of egress. These emergency lights are to provide for adequate illumination when, through accident or other cause, the regular lighting is extinguished.

Note.—It is the intention of this Order to guard against accident due to the failure of the regular lighting system, by providing sufficient illumination to enable the occupants to: avoid contact with moving machinery and other danger points until the regular lighting is again placed in operation, and to vacate the building safely and expeditiously when this is necessary because of fire or other causes.

(b) Emergency lighting systems, including all supply and branch lines, their runways, raceways and supports, shall be entirely independent of the regular lighting system, and shall be lighted concurrently with the regular lighting system and remain lighted throughout the period of the day during which artificial light is required or used.

(c) Emergency lighting shall have a minimum intensity of one-fourth (¼) foot-candle. The emergency illumination shall not exceed fifty (50) per cent of the distributed illumination.

(d) Emergency lighting systems shall be supplied from a source independent of the regular lighting system in theatres, public meeting halls, moving picture exhibition places, hospitals, schools, and any other place where the nature of the hazard is such as to require it, except where the hazard is granted by the Industrial Accident Commission. This source of supply and controlling equipment shall be such as to insure the reliable operation of the emergency lighting system when, through accident or other cause, the regular lighting system is extinguished. Where a separate source of supply can not be obtained for the emergency lighting, the feed for emergency lighting must be taken from a point on the street side of the service equipment. Where source of supply for the regular lighting system is an isolated plant within the premises, an auxiliary lighting system of sufficient capacity to supply all emergency lighting must be installed from some other source, or suitable storage battery; or separate generating unit may be considered the equivalent of such service.

Order 1509. **Switching and Control Apparatus —**

(a) Switches or other controlling apparatus shall be so installed that pilot or night lights may be controlled from a point at the main entrance, and/or other easily accessible points. Pilot or night lights may be a part of the emergency lighting system.

(b) All switching and control apparatus on emergency, pilot and night lights shall be plainly labeled for identification.

The Business Library

BY LOUISE B. KRAUSE

(You know how to use your engineering tools: do you know how to use your books — how to find the information you want? The librarian of H. M. Byllesby & Company of Chicago discusses here the place of reference books in the business library. The second part of the article will appear in our next issue. Attention is called to the necessity for written permission to reprint from this series.—The Editor.)

REFERENCE BOOKS FOR THE BUSINESS LIBRARY

All business organizations, whether they employ a librarian or not, have need of some reference books for general information as well as for special information along the lines of their individual work. If a librarian is not employed the reference books are not so valuable as they might be, because there is generally no one at hand so skilled in manipulating their indexes and contents, that the exact information required is immediately forthcoming; for it is in the field of reference books particularly that the business librarian acts as "Open Sesame" to the business man. The ability to find information is a matter of training; it does not suffice merely to possess books or to be told of existing resources. This truth was stated in a homely fashion some time ago by a practical engineering journal, which said:

> "Books are just as much engineering tools as wrenches, hammers, or cold chisels, and it takes practice to successfully manipulate them. We have all probably laughed at the novice's first attempt to use a monkey wrench,—a man can be just as clumsy with the books that he consults to assist him in solving his problems. Just as it took considerable time to acquire skill in handling tools about the plant, it also takes a lot of time to acquire the knack of getting information out of books," or to state the case in the words of the founder of the famous Poole index system, "The facile proficiency in the use of books does not come by intuition."

A Reference Book is a book which is to be consulted for definite points of information rather than read through, and is arranged with explicit references to ease in finding specific facts.

— E. C. Richardson

It is the purpose of this article and the one to follow, to make some practical comments on the best reference books for business libraries, from which each individual business library can make a selection according to its special needs.

The list aims to include only such reference books as have been found to be of actual use, and to exclude all references to books which although excellent in their lines, have no place in the work of the business library, and no further apology will be made for their omission.

Bibliographies

No attempt is made to describe bibliographically the books listed. This has been well done for most of them in **Kroeger's Guide to the Study of Reference Books**, third edition, published by the American Library Association, 78 East Washington street, Chicago, 1917, price $2.50. The few business men who have time to give to the detailed study of reference books will find this guide an authoritative treatise on the subject, and on file at the Public Library. Another useful aid in the selection of books for business libraries, both reference books and books on general business subjects, is entitled **"1600 Business Books,"** compiled by Sarah B. Ball, second edition, issued by the H. W. Wilson Company, New York City, 1917, price $1.50. This volume is very useful in showing what literature is in print on various business subjects, but as the entries are not annotated it is not a guide to the relative value of the books listed, but titles recommended for first purchase are starred under the subject entry. The publishers have announced that a new edition of this work is in preparation which will be annotated, and which will make it of much more value than it is in the present form.

Two excellent lists of worth while books on business subjects are **"A Select List of Books for Business Libraries,"** by Paul H. Nystrom in National Efficiency Quarterly, May, 1918, and **"A White List of Business Books,"** by John Cotton Dana, printed serially in "The Nation's Business," November, 1917, to date.

Selecting Reference Books

In selecting reference books for a business library it is wise to keep in mind the following facts. It does not necessarily follow that because a book is printed on a subject it is therefore worth while purchasing. Examine and test the credentials for worthiness of every reference book carefully. Even the best reference books fall down at some point and must be used with judgment. No matter how excellent a reference book appears to be in its accuracy and completeness, remember it is of no value to the business library unless that library has particular use for it. It is almost as serious a fault in a business library to have more books than are

needed as it is to have too few books to meet the needs. A good purchasing rule to follow, is to buy only after it has been clearly demonstrated that the library has no book which will give certain information desired, for it has been found that a few well selected reference books will answer a multitude of questions, and some of the business libraries doing the best work have comparatively few working tools of this class. It must be remembered also that it is not sufficient to buy a copy of an annual publication once, but that the latest edition must be purchased each year in order that the information may be kept strictly up to date.

Dictionaries

The first and foremost reference book which a business office needs is an English dictionary, for the men who dictate and the stenographers who write reports and letters must have an authoritative source to which they can turn for definitions, spelling, synonyms, hyphenation and pronunciation.

The two best single volume dictionaries, costing about twelve dollars each, are the latest editions of the **Standard Dictionary,** published by Funk and Wagnalls, and **Webster's New International Dictionary,** published by Merriam. Of these two dictionaries the preference of many scholars is for Webster, although the Standard is considered most excellent on present day words and their meanings. One of the drawbacks in using Webster hurriedly is the divided page. In the upper part of the page the main words of the language are given, and in the lower part in smaller type are given the minor words, foreign phrases and abbreviations.

In an office which prepares a great deal of advertising material, or "copy" for publication, a thesaurus dictionary will be very useful. **March's Thesaurus Dictionary of the English Language,** Philadelphia Historical Publishing Company, "designed to suggest immediately any desired word to express exactly a given idea; a dictionary of synonyms, antonyms, idioms, foreign phrases, pronunciation, a copious correlation of words," may be purchased for $15.00, if an elaborate dictionary of this kind is to be desired. **Roget's Thesaurus of English Words and Phrases** may be purchased in several editions, prices $1.25 up to $2.00.

The business library will do well to provide a few books on business English, pronunciation, capitalization, abbreviations and correspondence forms, a few of which are the following:

Vizetelly Desk Book of Errors in English, New York, Funk & Wagnalls, $1.00.
Putnam's Correspondence Handbook, New York, Putnam, $1.75.
Lewis Business English, Chicago, LaSalle Extension University, $1.40.
Manley & Powell Manual for Writers, University of Chicago Press, $1.25.
University of Chicago Manual of Style, University of Chicago Press, $1.50.
United States Public Printer Style Book, a compilation of rules governing executive, congressional and departmental printing, Washington, Superintendent of Documents, $0.15.

If a business library finds it needs any foreign language dictionaries, possibly French and Spanish, bilingual ones can be obtained in one volume editions from any first class book dealer at a cost of not more than $3.00 a volume.

The Encyclopedia

The new edition of the Century Dictionary and Cyclopedia is a luxury for a business organization and need not be considered in this list, but the business library must have a general encyclopedia, and the best one for the American business office is without doubt the **New International Encyclopedia,** published by Dodd, Mead and Company in 23 volumes, latest edition 1916. Price bound in library buckram, $6.00 per volume.

Its advantages for business use over the new edition of the much recently advertised **Encyclopedia Britannica,** are that the point of view of the articles covers American needs better, that all information is alphabeted under the most specific subject word, so that no index volume has to be consulted as is the case in using the Britannica, and that there are ample "see" references, if the subject looked up is entered under a different terminology.

In regard to its authority, comprehensiveness, illustrations, maps and bibliographical references at the end of the articles, the New International ranks in the first class of encyclopedia productions. It can be purchased printed on the much exploited India paper if the saving of shelf space means more to the business office than does the rapid turning of leaves. The India paper leaves are apt to stick together and also crumple easily. The most desirable binding is library buckram rather than flexible leather, which some business libraries have been unwise enough to purchase. Dodd, Mead and Company also issue an excellent annual encyclopedia entitled the **New International Year Book,** as a supplement to the New International Encyclopedia, which brings the Encyclopedia down to date at a cost of $5.00 per volume.

The World Almanac and Encyclopedia, published for the New York World both in cloth and paper binding at 50 and 25 cents per volume, is an invaluable addition to the business library, no matter how well supplied it may be with pretentious encyclopedias. It is strong on statistics of all kinds which are brought down to date and contains a wide range of miscellaneous information which cannot be found readily in more expensive handbooks. It has an excellent index and is generally the best book to consult in a hurry in answering the many miscellaneous questions which arise in a business office. It has been estimated that it will answer 25% of the questions which come up in every day business experience.

Lippincott's New Gazeteer of the World, a geographical dictionary, Philadelphia, Lippincott, 1906, price $10.00, is useful but much out of date in its statistics.

Are you interested in new generating stations? power house construction? the automatic substation? there will be something you want to know in the Power issue of the Journal of Electricity. It comes out on September 1st. Don't miss it.

California Electrical Co-operative Campaign

(The success of the California Electrical Cooperative Campaign is attested by all who have come in touch with its work. The following statement by the general agent of the Southern California Edison Company is a high tribute based on a conservative estimate of results achieved. The paper was read recently before the San Francisco Electrical Development League by Lee H. Newbert, Chairman of the Advisory Committee of the Cooperative Campaign.—The Editor.)

THE CALIFORNIA ELECTRICAL COOPERATIVE CAMPAIGN FROM THE VIEWPOINT OF THE CENTRAL STATION

BY S. M. KENNEDY

From the viewpoint of the central station, the work of the California Electrical Cooperative Campaign is progressing satisfactorily, and further plans now under way indicate conditions of a still more satisfactory character during the present year.

Campaign Aims —

The Campaign is being conducted along broad, liberal and progressive lines with ideals and aims of a high order. While the total volume of sales of labor-saving apparatus may not be as large today as it was before the central station curtailed its direct selling efforts, yet it is becoming more and more apparent that the cooperative plan as applied to sales work bids fair to produce an organization which will eclipse in efficiency, service and actual results anything that has gone before.

The central stations, in a recent convention at Coronado, again went on record as being solidly back of the Campaign. Under the supervision of the Advisory Committee, a condition is rapidly being brought about which gives better service to the public and incidentally more profit to those engaged in the electrical industry.

Improved Relations —

Nor is this all. Formerly when the central station was "paddling its own canoe," some contractor-dealers did not feel that their interests and those of the central station were mutual, but sometimes thought they had to fight the central station in order to hold their own. Although in constant contact with the public and in an excellent position to assist in smoothing out misunderstandings and to implant confidence in the minds of the central station's consumers, they did not always feel any incentive to do so.

Happily, this condition is practically a thing of the past, and the contractor-dealer is now learning to use his strategic position to foster better relations between the central station and the public.

Better Merchandising —

Simultaneously with these things, a further transformation is occurring, which is very gratifying to the central station. The personnel of the contractor-dealer is toning up and he is qualifying to occupy a much larger place in the business world than has heretofore been accorded him. Stores are better kept; sales methods are improving; a better accounting system is being adopted; credits are more stable; enthusiasm is awakening; opportunities are increasing; and while responsibilities are growing, satisfactory results are keeping pace.

Cooperative Advertising —

Practically all central stations in the state are contributing liberally of advertising space on broad and comprehensive lines. The encouraging quickness with which the various branches of the industry are tying-in in this educational campaign, cannot fail to result in a greater public interest in electrical goods than has heretofore been achieved by the sporadic advertising of the different branches. The pulling together of all branches of the industry in this advertising work has had a marked influence upon newspaper publishers, many of whom have awakened to the fact that something big is going on in the electrical industry.

The Contractor-Dealer's Part —

It must not be overlooked that one of the principal objects of the whole plan of the Campaign is to educate the contractor-dealer and make him a more aggressive, practical and progressive business man than he has generally been heretofore. The California Electrical Cooperative Campaign, or any other nation-wide campaign, cannot be considered successful unless the contractor-dealer is brought to realize the importance of all the work that is being cheerfully done to help him and is willing and anxious to take full advantage of the assistance that is being offered and given him. Cooperation is not a one-sided affair, and the contractor-dealer must do his share in the cooperative plan and qualify himself as a graduated student in merchandising, so that he may be able to take up the commercial work which he asks the central station to lay down and carry it on with credit and profit to himself and continuing satisfaction to the central station.

It is therefore obvious that the California Electrical Cooperative Campaign, as now conducted, will work out to the mutual advantage of all parties, if the contractor-dealer will take advantage of his present opportunity and make good. Will he do this? The Central Station believes that he will.

An exceptional program has been arranged for the Annual Convention of the Northwest Electric Light and Power Association, to be held in Seattle September 10th to 13th. An outline of the program will appear in our next issue.

SPARKS—Current Facts, Figures and Fancy

(Plans for a gold pool as well as helpful hints for hasty advertising agents are contributed by South America to this collection of odd items from everywhere. A Norwegian device for radio-telegraphy, the steel industry in Japan and Wales, a German message shell, a new street-conveyance in Paris, and generalities about foreigners will maintain the cosmopolitan tone which is appropriate for our foreign issue.—The Editor.)

War is quite a strain on the nation's pocket book: this one has cost the United States $30,205,000,000 up to June, 1919.

* * *

United States imports from Europe are decreasing: for the fiscal year ending June, 1919, they are estimated at $300,000,000 as compared with $900,000,000 in the three years preceding the war.

* * *

In Wales more than a hundred years ago there lived an old blacksmith who could weld steel so perfectly that the join was invisible and the temper of the steel absolutely unimpaired. But he refused to divulge his trade secret and it died with him.

* * *

Anyone who has been envying American officers their pleasant and exclusive mode of traveling in motorcycle side-cars had better go to Paris. Five hundred side-cars are to be licensed there like taxi-cabs, and will be for hire at about 20 cents a mile.

* * *

Japan is developing her steel industry to such an extent that it is predicted she may be able to sell her steel even on the British market within another ten or fifteen years. Discoveries of ore in Korea, and ore concessions in China are said to be the chief sources of the increased raw material.

* * *

A young British scientist has developed a set of instruments by means of which a message is conveyed over a ray of light. The sender speaks into a transmitter which sends out intermittent flashes of reflected light. A lens at the receiving end catches the light rays, which are then translated into speech through a telephone receiver by the action of selenium cells.

* * *

To do away with the expense and risk of shipping gold to pay for purchases between the United States and South America, a gold pool has been inaugurated. Settlements will be made periodically, and a standard coin, to be called the "panamerican," is proposed. The value of the "panamerican" would be about 20 cents.

* * *

At a power plant recently the water rose so high that it was spilling over the dam and flowing into the plant through the doors and windows. The situation was saved by the farmers of the neighborhood who turned out at midnight and manned the pumps for forty-eight hours until the water in the generating room could be lowered by other means.

A substitute for platinum in electrical apparatus has been the object of some private investigations. An alloy of 90 per cent gold and 10 per cent copper was found to be a satisfactory substitute for cathodes. After being electrically coated with a thin layer of platinum and then carefully polished and burnished, the same alloy was found suitable as an anode.

* * *

A message shell designed and used by Germany during the war is an object of interest in allied military circles. It is made for use in either a trench mortar or a 77 field piece; when it strikes a small explosion breaks open an outer chamber and ignites a powder with a colored glare and a thick smoke, equally conspicuous by night or day. The shell can then be opened and the message removed.

* * *

A new device for radio telegraphy has recently been patented by a Norwegian engineer. The current is received by an accumulator which releases it at regular intervals. The clearness of sound is dependent upon the regularity of the current, and by this system it is released with mathematical exactness. In addition to producing clearer sounds the device is considerably cheaper and simpler than those now in use.

* * *

"Grasping the unseen" is extremely simple if you have the right kind of mind. It is recorded that a certain advertising agent in South America conceived the brilliant notion of registering the names of incoming ship arrivals as his "prospects." The strange part about it is the fact that nobody objected for a long time, and in the event of the new arrival becoming an advertiser the far-sighted agent was permitted to claim the commission.

* * *

An unknown lady who evidently loved her country not wisely but too well once remarked in our hearing that if she had **her** way "every blessed foreigner should be turned out of the United States." The following statistics are for her especial enlightenment: There are some 15,000,000 foreign-born people in the United States. Among these, according to figures compiled in 1910, are 44,802 shoemakers, 43,322 butchers, 13,725 candy store owners, 65,117 grocers, 14,530 fruit store owners, 7,877 shoe store owners, 17,582 restaurant owners, 54,431 barbers, 15,108 hotel keepers—and thousands of others engaged in innumerable perfectly respectable businesses and professions.

PERSONALS

Captain Howard Angus, recently returned from distinguished service on the west front, has received the appointment of secretary of the California Electrical Cooperative Campaign, with headquarters in San Francisco. Captain Angus, a graduate of Occidental College, is an eloquent speaker and a journalist of wide experience. In military affairs during the great offensive of last year he was twice promoted for gallantry on the battlefield. During the attack on Gesnes, where the battalion was badly disorganized by heavy losses, Captain Angus on his own initiative gathered together the scattered elements of the command, bringing them forward and reinforcing the line under the most trying circumstances. At the signing of the Armistice his company held the record of being the most far advanced of any in action. During the recent campaign in the southern district of California to purchase the Edison distributing system Captain Angus had full charge of publicity that won the election for the city. It is believed the brilliant past accomplishments of Captain Angus, both in civil and military life, augur well for magnificent results ahead for the California Cooperative Campaign which has already accomplished such splendid work.

Dr. A. C. Crehore, the well known physicist who is a joint author of Bedell & Crehore's book on "Alternating Currents" which has attained wide use in the technical colleges and universities of the country, is now residing in Denver, Colorado.

R. Timmerman, formerly division manager for the Utah Power & Light Company at Bingham, Utah, has returned from approximately two years' service as a Lieutenant in the Navy, and will have charge of the Provo Division of the same company, succeeding A. P. Merrill, transferred to the Ogden Division.

A. A. Tacchella, Pacific Coast representative of the Busch-Sulzer Brothers Diesel Engine Company, has recently opened temporary offices in the Hotel Manx, San Francisco. **Max Rotter,** chief engineer of the company, with headquarters at St. Louis, is a San Francisco visitor. The new offices will specialize on marine installations.

George Elery Hale, director of the Mount Wilson Observatory and Foreign Secretary of the National Academy of Sciences who has been for the last ten years a Correspondent of the Academie des Sciences, Institut de France, has received the unusual honor of election as Associe Etranger, taking the place of Adolph von Baeyer, which has been declared vacant. The Foreign Associates are limited to twelve, and the high distinction has been held by only two Americans.

Robert Sibley, editor of the Journal of Electricity, and **Chas. H. Delany,** steam power plant specialist for the Pacific Gas & Electric Company, who were the joint authors of an extended series of articles on fuel oil and steam engineering that appeared in the columns of the Journal of Electricity, have been advised by the American Library Association Publishing Board that their new book on "Elements of Fuel Oil and Steam Engineering" appears in The Booklist for June among the list of "Best New Books of American Authors."

Louis R. Ardouin has asumed his duties as executive secretary of the San Francisco Association of Electrical Contractors and Dealers. Mr. Ardouin, previous to a year's service as athletic instructor with the Y. M. C. A., was State Secretary of the Minnesota Electrical Contractors and Dealers' Association at Minneapolis. During 1916 and 1917 he was secretary of the Builders' Exchange of Duluth, Minn. He consequently brings to his new duties a wide experience and thorough understanding of association work.

L. H. Stratford is the new manager of the Pocatello Gas & Power Company, with headquarters at Pocatello, Ida., and **E. D. McDonald,** former manager of the company, has been proffered a position with the company controlling the local concern in Chicago, Ill. Mr. Stratford comes from Great Falls, Mont., where for two years he was engaged as assistant manager of the W. A. Baehr Company, owner of the local gas plant. Mr. Stratford is well known in this section, having held important positions with the Utah Power & Light Company at Ogden and with the Portland Gas & Coke Company at Portland, Ore.

R. H. Ballard, vice-president of the Southern California Edison Company and president of the National Electric Light Association, has been in San Francisco since his conference of a month ago and with **John A. Britton,** vice-president and general manager of the Pacific Gas & Electric Company, who is serving as chairman of the Public Policy Committee of the Association, has outlined a most constructive program for the year ahead. Mr. Ballard is at present pushing the Geographic Section idea for national adoption, which has so forcefully demonstrated its usefulness in the West. At his request a copy of the August 1st issue of the Journal of Electricity has been forwarded to over five hundred power plant managers of the United States, calling attention to the leading editorial of that issue, to his own message that appears in the issue, and particularly to the message of **A. Emory Wishon,** assistant general manager of the San Joaquin Light & Power Corporation and president of the Pacific Coast Section, N. E. L. A., entitled "Three and One-Half Years of Achievement," wherein accomplishments of the Pacific Coast Section, N. E. L. A., are most forcefully set forth.

Lieutenant William E. Hubbard, USNRF, has returned to San Francisco, after two and one quarter years of war service in the United States Navy. Ten months of this time was spent on foreign service with the South Atlantic Squadron and the remaining period, on duty with the Bureau of Steam Engineering at Washington, D. C. While with the Bureau, Lieut. Hubbard originated and placed in operation a centralized controlling system for the maintenance of steam engineering material, a standardized dictionary of engineering nomenclature, a material marking and identification system and developed and designed a new type of gas engine for small motor boat propulsion. In addition to these duties he had charge of the repairs to all motor boat machinery including the 110-feet Submarine Chasers, and the production of the Norfolk Gas Engines, manufactured at the Navy Yard, Norfolk, Va. Mr. Hubbard has opened offices in the Hobart Building, where he will conduct, under the name of the Hubbard Machine Company, the business interrupted by his entry into the Federal Service, April 6, 1917, specializing in deep well machinery, of which he holds several patents, and also continue practicing his profession of consulting engineer.

A. E. Chandler, president of the California Water Commission, has passed in his resignation to Governor Stephens, to take effect October 1, 1919. At that time Mr. Chandler will enter the law firm of Haven, Athearn, Hall and Chandler, forming thereby a group of men well known in legal affairs of the West. Mr. Chandler is at present president of the San Francisco Engineers' Club and is the author of "Elements of Western Water Law," a book that is used as the text on this important subject in many of our universities and colleges. He is considered among engineers generally as one of our ablest interpreters of water law. His work for the state has been highly constructive, and this announcement of his retirement from the California Water Commission will deprive the present state administration of one of its ablest men. From all quarters of the West Mr. Chandler carries with him the sincerest of good wishes for success in his new activities, which will be largely concerned with water law and its interpretation.

E. H. Bell of San Francisco has recently joined the sales forces of the Electric Material Company.

W. T. Goddard, chief engineer of the Locke Insulator Company, Victor, N. Y., is among recent prominent visitors to San Francisco.

C. G. A. Baker, of the Baker-Joslyn Company, has returned to San Francisco from Los Angeles, and **H. F. Hartzell** is now at the company's Seattle offices.

Edward B. Snyder, sales agent of the high tension division of The Ohio Brass Company of Mansfield, Ohio, is a recent San Francisco visitor. Mr. Snyder is accompanied by **A. O. Austin,** chief engineer of the porcelain division of his company.

John Gregory, formerly assistant bank examiner for Nevada, and brother of S. B. Gregory, Pacific Coast manager of the Arrow Electric Company, has been made executive secretary for the Oakland (Cal.) Association of Electrical Contractors and Dealers.

Pio Venturini, electrical engineer for the Mining and Electric Company of the Arno Valley, Florence, Italy, is a Pacific Coast visitor. Mr. Venturini is inspecting many of the great hydroelectric companies of America and expects to return to Italy in November.

Ell C. Bennett of St. Louis, Mo., has resigned office as the seventeenth Mercury of the Jovian Order, to which post he was elected last October, to serve until January, 1920, to join the International Paint Corporation in the capacity of secretary and general manager.

Ralph B. Clapp, sales agent, has returned from France, where he has been serving as a secretary of the Y. M. C. A., and will resume his work as Southern California representative of the American Circular Loom Company, Stanley & Patterson, and the Electric Engineering Equipment Company.

Ira Francis, Pacific Coast manager of John Roebling's Sons Company, has returned to his San Francisco office after a business trip to Trenton, N. J., and other eastern centers. Mr. Francis says he feels unusually grateful for the cool San Francisco fogs after the recent weather he passed through in eastern points.

J. E. Davidson, formerly vice-president and general manager of the Pacific Power and Light Company, and well known to the men of the electrical industry in the West, is retiring from office as president of the Nebraska Section of the National Electric Light Light Association, and will be succeeded by T. H. Fritts of Grand Island, Nebraska. Mr. Davidson is at present with the Nebraska Water Power Company at Omaha.

Sven Hallsjo, an electrical engineer of Sweden who repsents private and public cooperative effort in charge of electrical economic production in Sweden, is now visiting the West in order to study modern construction for transmission of energy for agricultural purposes. Mr. Hallsjo has recently spent some time in San Francisco and the San Joaquin valley.

J. C. Clark, associate professor of electrical engineering at Stanford University, has returned from an eastern trip of several weeks, during which time he attended the sessions of the Lake Placid Convention of the American Institute of Electrical Engineers. Professor Clark represented the San Francisco Section of the Institute, of which he has been the local chairman during the year just ended.

Capt. W. D. A. Peaslee, formerly consulting electrical engineer at Portland, Ore., and recently returned from France, has been made chief engineer for the Jeffery-Dewitt Insulator Company with headquarters at Huntington, West Virginia. In company with **A. L. McLeod,** general manager of the company, he has been visiting Pacific Coast points during the past two weeks. While in France Capt. Peaslee had varied and interesting experiences. Going over with the 537th Engineers, because of his knowledge of French he was assigned liaison and reconnoissance work with the French army, then became motor-transportation officer for the chief engineer of the First Army. After the Armistice was signed he was assigned to the peace commission as executive officer of the information and liaison department and later put on special duty at Sorbonne University, where he was granted the Diplome d'Etudes Superieur.

H. E. Sanderson, Pacific Coast manager of the Bryant Electric Company with headquarters in San Francisco, has returned from a short trip through the Sierras and reports that business and fishing are both good. The shadow in the foreground is that of W. M. Deming, president and general manager of the Journal of Electricity, who has also recently had a most enjoyable auto trip up in the high Sierras in company with Mr. Sanderson.

H. N. Sutherland of the General Electric Company, Schenectady, N. Y., is among recent visitors to this coast and has been spending some time in San Francisco and the bay region.

OBITUARY

Chas. H. McGwire, assistant chief engineer of the Board of Public Utilities of Los Angeles, leaped to his death recently from the eleventh story of the Hall of Records building in Los Angeles. Mr. McGwire has during the past year served as local chairman of the Los Angeles Section of the American Society of Mechanical Engineers.

Oscar Otto, General Superintendent of the South Philadelphia Machine Works of the Westinghouse Electric & Manufacturing Company, died on June 30th from injuries received in an automobile accident. Prior to accepting a position as General Superintendent of the Westinghouse Machine Works at East Pittsburgh in 1909, Mr. Otto spent some years in the West with the Northern Pacific Railroad Company, of Tacoma, Wash. He was at the Westinghouse Company's new plant at Essington, Pa., from February 1918 until his death.

Meeting Notices for Electrical Men

(Organizations as a whole are still affected by the vacation period, especially in the coast region. Nebraska, however, sends in a report of a recent interesting electrical convention, while plans for the Foreign Trade Convention next year are already under way. The California Association of Electrical Contractors and Dealers has held important business meetings and made various changes in by-laws.—The Editor.)

California Association of Electrical Contractors and Dealers

The California Association of Electrical Contractors and Dealers announces that its new offices are at 645 New Call Building, 72 New Montgomery street, San Francisco.

The secretary of the Association calls the attention of members to Article VIII of the Constitution which reads as follows:

"Authorized Representatives —

"Every person, firm or corporation shall file with the Executive Secretary a statement authorizing an individual to act for them, this individual to be known as their representative. This representative shall cast vote of firm. His acts shall be deemed as the joint acts of the firm or corporation. No representative shall act for a shorter period than one year, unless change of representatives is approved by two-thirds vote of members present at any meeting."

The secretary requests that statements in accordance with this article be sent in for the files as soon as possible.

An important development is the new system of paying dues. For the information of those who were not there the By-Laws covering this are quoted:

"Article XI —

"Dues of each member shall be based upon the equivalent of the inspection fees paid by him to the Department of Electricity of the City and County of San Francisco for electrical wiring only. The record of this fee shall be obtained from the Department of Electricity of the City and County of San Francisco by the Executive Secretary. Minimum dues in all cases shall be Three Dollars ($3.00) per month."

Members will be billed for these weekly or oftener until further notice, as circumstances dictate.

Another important step taken at a recent meeting was the inauguration of a new system of filing bids in the Association office for the protection of members. For the information of those who were not present, the following revised By-Laws, now in effect, are quoted:

"Filing of Duplicate Bids —

"Section 1. Whenever a member of this Association is called upon to figure or estimate on electrical work exceeding Five Hundred Dollars ($500.00), he shall immediately communicate with the Executive Secretary, apprise him of the name of the job, location, names of owner, architect, or general contractor. Upon receipt of this information the Executive Secretary will request from the official receiver of the bids a definite time for the opening of the said bids. The Executive Secretary having ascertained this definite time, will communicate this information to all bidders and demand that a signed copy of the bid in question be filed in the office of the Executive Secretary, not later than one hour previous to the time of opening, in a sealed envelope furnished by the Executive Secretary for this purpose.

"Section 2. The bids so filed as aforesaid shall not be opened until one hour after the time set for the opening of bids by the official receiver thereof.

ARTICLE XIX

"Section 1. No member of this Association shall submit figures of any kind to anyone unless he is requested to do so, but this is not meant to prevent any member from soliciting an opportunity to submit bids.

"Article 2. No member of this Association shall submit electrical bids wherein the electrical work is combined with other lines of work, nor shall he accept contracts of such nature unless rejected.

"Section 3. On the original bid no substitutes nor alterations not included in the original plans and specifications as submitted to bidders shall be submitted or figures by any member of this Association.

"Section 4. When deductions, substitutions or alterations are made in an electrical figure within the original plans and specifications as submitted to bidders, a member of this Association will file a copy of his bid covering these changes with the Executive Secretary in the same manner as the original bid, to which the duplicate bid will be attached."

BUILDERS OF THE WEST — LIV

CHARLES P. STEINMETZ

Knowledge of the exact mathematical laws that control the great modern servant of mankind—electricity—has proven the driving vision that has in large measure made possible the harnessing of water power in the wonderful mountain fastnesses of the West and its transmission over lofty mountain ranges and across thirsty deserts to the rich agricultural and industrial centers of the West to a degree equaled nowhere else in the world. To Charles P. Steinmetz, erecting engineer for the General Electric Company, this issue of the Journal of Electricity is affectionately dedicated, in appreciation of his masterly grasp of mathematical law and application in design of electrical apparatus.

Foreign Trade Convention

The preliminary arrangements for the seventh National Foreign Trade Convention, to be held in San Francisco May 12th to 15th, 1920, are being formulated at this time. Many new features will be inaugurated by way of reception and entertainment for the delegates of this world-wide convention, for such indeed will be the scope as indicated by arrangements recently completed. The Pacific Mail Steamship Company has promised to have a special steamer from Calcutta to San Francisco and another from Valparaiso to San Francisco, stopping at the principal ports enroute to pick up delegates coming to the San Francisco convention.

The San Francisco Chamber of Commerce will have charge of the local arrangements for the seventh National Foreign Trade Convention under the general direction of the Pacific Coast Committee of the National Foreign Trade Council consisting of Frederick K. Koster, chairman, Robert Dollar and J. K. Armsby. These gentlemen are all Councillors of the National Trade Organization.

C. P. Converse, Pacific Coast Secretary of the National Foreign Trade Council, will have charge of the details of the plans of the local and national committee.

It is hoped to have a larger delegation in San Francisco in 1920 than attended Chicago in April of this year. It will be necessary to have some 2,000 representatives in order to do this.

National Electric Light Association

The Overhead Systems Committee of the National Electric Light Association, formerly called the Overhead Lines Committee, desires through the Journal of Electricity to request the cooperation of all members and member companies in this year's work of the committee.

The committee plans to bring up to date the descriptions, specifications and other matter previously published relating to overhead line construction. Information will be compiled regarding recent experience and new practices, with especial attention to any innovations and other features developed during the war period.

To make this work complete, the committee needs active assistance, and it would be much appreciated if members will communicate freely with the committee furnishing any information to suggest any features which they think should be developed in the next report. Matter of this kind should be

presented in sufficient detail so that the committee can work to the best advantage in securing the desired information.

It is suggested at this time that the previous reports of the committee be reviewed by members in order to determine the character of the recommendations and information still required. If such attention is paid to the subject, the committee's activities will be guided by the real necessities of the industry and there will be a greater production of valuable constructive data, without repetition of information already available.

It is hoped the work of the committee will not only be facilitated by these contributions, but that members will avail themselves of this opportunity to make use of their committee by indicating the kind of assistance they desire.

Electrical Supply Jobbers' Association

On account of the scheduled arrival of the fleet in San Francisco bay, the next meeting of the Pacific Division of the Electrical Supply Jobbers' Association has been postponed until August 18, 19 and 20.

The gathering will take place at Del Monte, and it is expected that large numbers of electrical men from all parts of the Pacific Coast will be present. The program has not as yet been definitely announced.

California Electrical Cooperative Campaign

A meeting of the Advisory Committee of the California Electrical Cooperative Campaign has been called for 10 a.m. Thursday, August 21, 1919, at Hotel Del Monte, Del Monte, California.

Attention is called to the fact that this meeting comes at the conclusion of the Pacific Coast Electrical Supply Jobbers' Association, which meets on the 18th, 19th and 20th of August at Del Monte.

American Society of Heating and Ventilating Engineers

The American Society of Heating and Ventilating Engineers draws its membership from the ranks of ventilating and heating engineers and experts, and from among those engineers in other lines who have had particular experience in the field of ventilating and heating. The objects of the society are the promotion of the arts and sciences connected with heating and ventilating in all branches; the maintenance of a high professional standard among its members; the reading, discussion and publication of professional papers calculated to advance the science of heating and ventilation; and the interchange of experience among members.

The headquarters of the organization are at 29 West Thirty-ninth street, New York City.

Nebraska Electrical Association

An interesting convention of the Nebraska Electrical Association was held recently at Grand Island, Nebraska. The opening meeting was called to order by President J. E. Davidson, who gave his annual report of the activities of the Association and appointed the following members to the nominating committee: Conlee, Shaw, and Boyies. Mayor J. L. Cleary of Grand Island welcomed the delegates to the city in a very interesting talk.

The convention was addressed by C. H. Kelsey of Norfolk, Nebraska, Mr. Shaw of Lincoln and Mr. Conlee of Beatrice replying.

J. R. Smith gave a talk on "Selling Securities to the Public," which was instructive and very interesting, and Mr. Davidson and S. B. Harvey gave general talks on their experience in selling securities to their customers.

Chas. B. Scott of Chicago and Walter Byrne of Omaha read papers on "Safety Rules and Regulations" and "New Business Activities," respectively. General discussion followed.

A paper on "Modern Steam Plants," by H. A. Lynette of Chicago, and one on "Public Policy Activities," by F. E. Helvey, also aroused great interest.

A rising vote of thanks was extended to Mr. Scott and Mr. Lynette for their presence and the very interesting papers they prepared. A vote of thanks was also extended to the Central Power Company and their employes for the excellent entertainment that they provided for the delegates; to the jobbers present for their many courtesies extended to the Nebraska Electrical Association, and to the Grand Island Commercial Club for furnishing automobiles for the pleasure of the convention.

One of the interesting features of the event was an automobile trip to Boelus, Neb., to visit the hydro-plant of the Central Power Company.

The following officers were elected for the coming year: president, T. H. Fritts of Grand Island; first vice-president, J. B. Harvey, of Omaha; B. H. Conlee was appointed secretary by the president.

WHERE THE MEN OF THE INDUSTRY MEET

(The place where you can find where and when the other man meets. Information as to changes in officers, or additions or corrections, should be addressed to the Service Editor, Journal of Electricity. It is hoped to keep this directory up to date, so that travelers in a strange town who wish to attend the meetings of allied groups may not be misdirected.—The Editor.)

A. I. E. E.—WESTERN SECTIONS

National Officers
President—Calvert Townley, Westinghouse Electric & Manufacturing Company.
Secretary—F. L. Hutchinson, Engineering Society Bldg., New York City.
Meetings—Monthly.

Los Angeles Section
Chairman—J. H. Cunningham, General Electric Co., Los Angeles.
Secretary—Clem A. Copeland, Bureau of Power and Light, Los Angeles.
Meetings—Second Tuesday of each month.

Portland Section
Chairman—W. D. Scott, Pacific Telephone & Telegraph Company, Portland, Ore.
Secretary—E. H. Le Tourneau, Portland Railway, Light & Power Company, Portland, Ore.
Meetings—Monthly.

Denver Section
Chairman—Prof. H. S. Evans, Univ. of Colorado, Boulder.
Secretary—Robt. B. Bonney, Mountain States Tel. & Tel. Co., Denver, Colo.
Meetings—Third Saturday of each month, at the Shirley Hotel.

San Francisco Section
Chairman—W. G. Vincent, 445 Sutter St., San Francisco.
Secretary—Allen G. Jones, Rialto Bldg., San Francisco.
Meetings — Fourth Friday each month—Engineers' Club, 7 p.m.

Seattle Section
Chairman—John Harisberger, 4015—4th Ave. N. E., Seattle, Wash.
Secretary—T. C. Smith, City Lighting Department, Seattle, Wash.
Meetings—Monthly on third Tuesday in Chamber of Commerce Assembly Room, 9th floor, Arctic Bldg.

Spokane Section
Chairman—George Nixon, Main and Lincoln Sts., Spokane.
Secretary—G. H. Hoppin, 1128 W. Kiernan Ave., Spokane.
Meetings—Third Friday of each month.

Utah Section
Chairman—A. S. Peters, Mountain States Telephone & Telegraph Co., Salt Lake City, Utah.
Secretary—H. T. Plumb, 183 U St., Salt Lake City, Utah.
Meetings—Third Wednesday of alternate months, 8 o'clock. Assembly Room of Commercial Club, Salt Lake City.

Vancouver Section
Chairman — R. F. Hayward, Western Canada Power Co., Ltd., Vancouver, B. C.
Secretary — T. H. Crosby, Canadian Westinghouse Co., Vancouver, B. C.

A. I. E. E.—WESTERN BRANCHES

University of California Branch
Chairman—A. E. McMahon, University of California, Berkeley, Cal.
Secretary—D. D. Davis, University of California, Berkeley, Cal.

University of Colorado Branch
Meetings—First and third Thursdays of each month of the school year in the Engineering Building, University Campus.

Idaho University Branch
Meetings — First Wednesday evening of each month from October to June.

University of Washington Branch
Chairman—Jack Tolmie, Univ. of Washington, Seattle.
Secretary—Glen Walker, Univ. of Washington.
Meetings—Monthly, first Tusday, Forestry Bldg.

Oregon Agricultural College Branch
Chairman—Lawrence Fudge, Oregon Agr. College, Corvallis, Ore.
Secretary—Otto L. Cantrall, Oregon Agr. College, Corvallis, Ore.

Stanford University Branch

Montana State College Branch
Secretary—J. A. Thaler, Montana State College, Bozeman, Mont.
Meetings—Third Friday of every month of the school year in the Electrical Bldg.

Throop College of Technology Branch
Chairman—Mark Sawyer, Throop Dormitory, Pasadena, Cal.
Secretary—Russell Otis, Throop Dormitory, Pasadena, Cal.

State College of Washington Branch
Chairman—Clarence E. Guse, Pullman.
Secretary—Ralph C. Guse, State College of Washington, Pullman.
Meetings—Bimonthly at Mechanics Art Bldg., Pullman, Wash.

CONTRACTOR-DEALER ASSOCIATIONS

National Association of Electrical Contractors and Dealers
Chairman—W. Creighton Peet.
Secretary—W. H. Morton, 110 West 40th St., New York.
Executive Committeemen, Pacific Division—J. R. Tomlinson, Portland, J. F. NePage, Seattle, Wash.

Electrical Contractors & Dealers of Salt Lake City
President—G. W. Forsberg.
Secretary—E. H. Eardley, Eardley Bros., Salt Lake City.

British Columbia Ass'n Electrical Contractors and Dealers
President—E. Brettell, Vancouver, B. C.
Secretary—Capt. W. J. Conway, Vancouver, B. C.
Meetings—First Tuesday of each month.

California Ass'n of Electrical Contractors and Dealers
President—M. A. De Lew, 180 Jessie St., San Francisco.
Secretary—J. W. Redpath, Rialto Bldg., San Francisco.
Meetings—Monthly.

Denver Electrical Contractors' Association
President—E. C. Headrick.
Secretary—C. N. Shannon, 227 Coronado Bldg.
Meetings—2nd and 4th Monday nights of each month.

Electrical Contractors and Dealers Ass'n of San Francisco
President—C. L. Chamblin, 641 Mission St., San Francisco.
Secretary—Louis R. Ardouin, San Francisco.
Meetings—Friday, 12:30; New Call Bldg.

Southern California Electrical Contractors and Dealers
President—G. E. Arbogast, 724 So. Olive St., Los Angeles, Cal.
Secretary—J. E. Wilson, 425 Consolidated Realty Bldg., Los Angeles, Cal.
Meetings—Every Friday at 6:30 p.m. at the Pin Ton Cafe, 427 South Broadway.

Monterey Bay Electrical Contractors and Dealers
President—W. Cox, Santa Cruz.
Secretary—D. K. Noggle, Monterey.

Nevada Ass'n of Electrical Contractors and Dealers
President—F. V. McAvoy, 138 N. Canter St., Reno.
Secretary—R. W. Shearer, 215 Sierra St., Reno.
Meetings—Twice a month, 15th and 30th.

Oregon State Ass'n of Electrical Contractors and Dealers
President—R. C. Kenney, 388 Burnside street, Portland.
Secretary—J. Willis Oberender, 209-10 McKay Bldg., Portland, Ore.

Portland Local Ass'n of Electrical Contractors and Dealers
President—Roy C. Kenney, Portland.
Secretary — J. W. Oberender, 209-10 McKay Bldg., Portland.
Meetings—Alternate Mondays at Imperial Hotel Grill.

Sacramento Section, California Electrical Contractors & Dealers' Association
President—W. H. Gribble, Sacramento.
Secretary—H. Berg, Sacramento.

Washington Ass'n of Electrical Contractors and Dealers
President—V. S. McKenny, NePage & McKenny Co., Armour Bldg., Seattle, Wash.
Secretary—Forrest E. Smith, Seattle, Wash.
Meetings — Quarterly—second Thursdays of March, June, September and December.

JOBBERS' ASSOCIATIONS

Electrical Supply Jobbers Association
General Secretary—Franklin Overbagh, 411 So. Clinton St., Chicago, Ill.
Meetings—Semi-annual.

Pacific Coast Electrical Supply Jobbers
President—T. E. Bibbins, 575 Mission St., San Francisco.
Secretary—Albert H. Elliot, 544 Market St., San Francisco.
Meetings—Quarterly.

Electrical Credit Ass'n of the Pacific Coast
President—J. H. Zweifel, Electrical Appliance Co., San Francisco.
Secretary—Albert H. Elliot, 544 Market St., San Francisco.
Meetings—annually; San Francisco; May.

OF ELECTRICAL INTEREST

California Electrical Cooperative Campaign
Chairman Advisory Committee—L. H. Newbert, 445 Sutter St., San Francisco.
Secretary—Captain Howard Angus, New Call Bldg., San Francisco.

Colorado Electric Light, Power and Railway Association
President—E. A. Phinney, Jefferson Co. Power & Light Co.
Secretary-Treasurer—F. P. Safford, Denver Gas & Electric Co., Denver, Colo.

National Electric Light Association
President—R. H. Ballard, Southern California Edison Company.
Secretary—T. Comerford Martin, 29 West 39th St., New York.

Nebraska Section, N. E. L. A.
President—T. H. Fritts, Central Power Company, Grand Island, Neb.
Secretary-Treasurer—B. H. Conlee, Beatrice Gas & Electric Company, Beatrice, Neb.

Nevada Section, N. E. L. A.
Chairman—Geo. A. Campbell, Reno, Nev.

Pacific Coast Section, N. E. L. A.
President—A. E. Wishon, San Joaquin Light & Power Corporation, Fresno, Cal.
Secretary—A. H. Halloran, Journal of Electricity, Electric Bldg., San Francisco.
Meetings—Annually, in April.

Portland Section, N. E. L. A.
Chairman—F. H. Murphy, Portland Railway, Light & Power Company.
Secretary—Geo. Bowen, Portland, Ore.

Illuminating Engineering Society
President—S. E. Doane.
Secretary—Clarence L. Law.
Western Representatives—Romaine Myers, Bacon Bldg., Oakland, Cal.; C. M. Masson, Edison Bldg., Los Angeles; F. H. Murphy, Portland Railway Light & Power Company, Portland, Ore.; W. R. Putnam, Utah Power & Light Company, Salt Lake City; Fred A. Osborn, University of Washington, Seattle, Wash.
Meetings—First Tuesday each month.

New Mexico Electrical Association
President—D. W. Morgan, Las Cruces, N. M.
Secretary—Charles Twogood, Albuquerque, N.M.
Meetings—Annually, in February.

Southwestern Electrical and Gas Association
President—W. A. Sullivan, Shreveport, La.
Secretary—H. S. Cooper, 403 Slaughter Bldg., Dallas, Texas.

Northwest Electric Light and Power Ass'n
President—H. J. Gille, Puget Sound Traction Light & Power Co.
Secretary—W. E. Herring, Puget Sound Traction, Light & Power Co.
Meetings—Convention held annually. Executive Committee, governing body of Association, meets upon call of its chairman.

Los Angeles Jovian Electrical League
President—A. E. Peat, San Joaquin Light & Power Corp.
Secretary—Frank Weiss, Los Angeles Gas & Electric Corp.
Meetings—Every Wednesday, 12 m.

San Francisco Electrical Development League
President—Henry Bostwick, 445 Sutter St., San Francisco.
Secretary—J. W. Redpath, Rialto Bldg., San Francisco.
Meetings—Every Monday, 12:10 p.m.; luncheon, Palace Hotel.

Electric Metermen's Association
President—J. E. Bridges, Westinghouse Electric & Manufacturing Company.
Secretary—A. E. Coney, Great Western Power Company, San Francisco.
Meetings—About every 60 days.

Alameda County Electrical Club
President—George Drew, Pacific States Electric Company, Oakland, Cal.
Secretary—George B. Furniss, Pacific Gas & Electric Company, Oakland, Cal.

Synchronous Club
Secretary—H. N. Beecher, City Hall, Los Angeles.

Telephone and Telegraph Society of the Pacific Coast—San Francisco Section
President—W. H. Brommage, Pacific Tel. & Tel. Co., San Francisco.
Secretary—Chas. H. Dobson, 835 Howard St., San Francisco.

MECHANICAL ENGINEERS

National Officers
President—Mortimer E. Cooley, Electrical Engineering Dept., AnnArbor, Mich.
Secretary—Calvin W. Rice, Engineering Society Bldg., New York City.

San Francisco Section, A. S. M. E.
President—W. F. Durand, Stanford University, Palo Alto, Cal.
Secretary—Jas. A. Kinkead, Rialto Bldg., San Francisco.
Meetings—Quarterly.
Thursday lunches have been arranged at the Engineers' Club, 57 Post St.

Los Angeles Section, A. S. M. E.
President—Charles H. McGuire.
Secretary—T. J. Royer.
Meetings—Quarterly.

ENGINEERS' CLUBS

Oregon Society of Engineers
President—John W. Cunningham, 414 Spalding Bldg., Portland.
Secretary—Orrin E. Stanley, Box 973, Portland.
Meetings—Annual: First Monday in February. Monthly: Third Thursday of each month. Third Thursday of each month.

The Engineers' Club of Seattle
President—H. E. Horrocks, Seattle, Wash.
Secretary—E. J. Bartells, Northern Life Bldg., Seattle, Wash.
Meetings—Thursday noon at the club rooms at 410 Arctic Bldg. A buffet luncheon is served every day. A special welcome is extended to all engineers visiting the city.

Engineers' Club of San Francisco
President—A. E. Chandler, New Call Bldg., San Francisco.
Secretary—J. R. Brownell, Manufacturers' Indemnity Exchange, San Francisco.
Annual Meeting: October.

Idaho Society of Engineers
President — W. H. Gibson, Mountain Home, Idaho.
Secretary—Ira F. Shaffner, Boise, Idaho.

Engineers' Club of Oakland
President—R. S. Chew, Oakland Chamber of Commerce, Oakland.

Engineers' Club of Sacramento
President — George S. Nickerson, 914 Forum Bldg., Sacramento.
Secretary—P. M. Noeboe, State Department of Engineering, Forum Bldg., Sacramento.

Colorado Engineering Council
President—Arthur Ridgway, 810 Equitable Bldg., Denver.
Secretary-Treasurer—Robert J. Grant, 614 Interstate Trust Bldg., Denver.

United Engineering Societies of San Francisco
Chairman—C. D. Marx, Stanford University.
Secretary—Nathan Bowers, Rialto Bldg., San Francisco.

Joint Committee Technical Societies of Los Angeles
Chairman, George A. Damon, San Fernando Bldg., Los Angeles.
Secretary—W. K. Barnard, 705-6 Central Bldg., Los Angeles.

Utah Society of Engineers
President—Leonard Cahoon.
Secretary—Wm. H. Kelsey.
Meetings—3rd Wednesdays except May, June, July and August.
Annual banquet—May.

MISCELLANEOUS

American Ass'n for the Advancement of Science—Pacific Division
President—John Campbell Merriam, University of California; Acting Chairman National Council of Research.
Secretary (acting)—J. R. Douglas, 430 Library, University of California, Berkeley, Cal.
Meetings—Annual.

Portland Section A. S. C. E.
President—P. H. Dater, Eng. U. S. Forestry Service.
Secretary—C. P. Keyser, Park Bureau, Portland, Oregon.
Meetings—At call of president.

Spokane Engineering & Technical Ass'n
President—L. K. Armstrong, A. S. M. E.
Secretary—A. D. Butler, City Engineer, Spokane, Wash.
Meetings—Third Friday of each month. Joint with A. S. C. E., A. I. E. E. and A. S. M. E.

Foreign Trade Club
President—W. H. Hammer, Monadnock Bldg.
Secretary—Wm. E. Hague, Monadnock Bldg.
Meetings—238 Merchants Exchange Bldg., San Francisco. Every Wednesday evening.

Pacific Coast Gas Association
President—John D. Kuster, care Pacific Gas & Electric Co., San Jose, Cal.
Secretary—Henry Bostwick, 445 Sutter St., San Francisco.

Society for Promotion of Engineering Education
Secretary—F. L. Bishop, University of Pittsburgh, Pittsburgh, Pa.

HAPPENINGS IN THE INDUSTRY

AMENDMENTS TO THE COMPENSATION LAWS

On July 22, 1919, the amendments to the Workmen's Compensation, Insurance and Safety Act, as adopted by the last California Legislature, became effective. The Industrial Accident Commission has prepared a summary of these amendments. Approximately seventeen changes were made in the Act.

The waiting period was reduced from ten days to seven days. Compensation will be payable to the injured man on the eighth day after he leaves work as the result of an industrial injury.

When an employe under sixteen years of age is injured, it shall be the presumption that such injury was not caused by serious and wilful misconduct.

Serious and wilful misconduct cannot be charged against the injured employe by the employer if the injury is caused by the failure of the employer to comply with any provision of law or any safety order of the commission with reference to the safety of places of employment.

In claims of serious and wilful misconduct made against the employer, the general superintendent is made responsible for the corporation, as well as the executive or managing officer.

Non-resident aliens are required to prove their dependency and cannot be conclusively presumed to be dependent.

Applications for adjustment of controversies may be filed with the Industrial Accident Commission by the attorney or other representative of an injured employe, if authorized to do so in writing.

A lien against compensation will be permitted for the support of dependents, as well as for the living expenses of the employe.

Self-insurers shall not be required to pay sums into the State Compensation Insurance Fund to cover liability for compensation, except in life pension cases.

It is a misdemeanor not to report forthwith a fatal industrial injury, by either telephone or telegraph, to the Industrial Accident Commission.

An injunction may be issued against an unsafe place of employment if it constitutes a serious menace to employes, provided that such application for an injunction comes from the Industrial Accident Commission or a member of the Commission.

The Commission is authorized to tag dangerous machinery and the use of such machinery is prohibited until the tag is removed by an authorized representative of the Commission.

Chapter 183 creates a liability on the part of the employers or their insurance carriers, in addition to any liability heretofore fixed by law, in case of the death of an employe who leaves no dependents. Under such conditions it is required that a death benefit of $350 be paid and the Industrial Accident Commission is authorized to draw upon the fund created for the promotion of re-education and rehabilitation of persons disabled in industry in California. This new law was passed in response to a public demand that crippled men be aided in acquiring new occupations. It will reduce dependency and prove of material benefit to the citizens of the state.

KONGOZAN ELECTRIC RAILWAY COMPANY

Kongozan, the celebrated mountain in Chosen, noted for its fine view, is soon to have an electric railway winding up it. The project has long been contemplated by a group of influential business men in Tokyo and the preparatory work is now under way. The project will connect Tetugen Station of the Chosen Trunk Line and Kongozan by an electric railway. Permission to harness the Kanko river for water power has been secured, and the plans for the electrical work are now being worked out. Some 5000 kw. will be developed from the site, a part of it being used for the railway and the remainder reserved for general use. The total length of the railway will be about 63 miles.

LINE EXTENSION

The Sioux City Service Company is contemplating an extension of its lines to supply Ponca, Neb., and Jefferson, S. D. The extension will probably consist of a twenty-mile addition to one of the 13,200-volt lines already in use.

BRONZE IMPULSE TURBINES FOR JAPAN

Other countries than our own are feeling the approaching fuel shortage and the need of developing all available water power. This is strikingly evidenced by the equipment now being built for the Aomori Electric Light Company, of Japan, by the Pelton Water Wheel Company.

The hydraulic unit is a 5000 hp., 560 ft. head double nozzle impulse turbine, constructed almost entirely of bronze. The water available for power purposes contains a small increment of sulphuric anhydrite and the bronze construction was necessary to prevent corrosion resulting from the presence of the acid in the water.

All parts of the equipment liable to contact with the water are of solid bronze, or bronze-covered, except the wheel housing, which is lead lined. All other parts of the unit not directly subject to contact with the water are given special non-corrosive treatment to protect against fumes.

Previous small installations of steel units on the same water supply have suffered from corrosion, and two smaller units similarly constructed of bronze proved the necessity of using bronze for this work.

ELECTRICAL EDUCATION IN JAPAN

There are four universities in the Japanese Empire where electrical engineering is taught in college grades; they are the following:

Tokyo Imperial University;	5000 students,	Tokyo
Kyoto	"	"	Kyoto
Kyushu	"	"	Fukuoka
Sendei	"	"	Sendei

A considerable number of electrical papers are published in the country. Among them are the following:

Mazda Shimpo (News), deals principally with Mazda lamps and illuminating engineering.
Ohm, journal of electrical engineering.
Proceedings of Japanese Electrical Association, similar to N. E. L. A.
Proceedings of Illuminating Engineering Society.
Electrical Review, treating of electrical engineering.
Electricity in the Present.
The Standard, treating of the economics of electrical enginering and other electrical engineering subjects.
Electrical Review.
Electrical World, published at Osaka.
Proceedings of the Japanese Institute of Electrical Engineers.
Electrical World, published at Tokyo.
Electrical News, published twice a month.
The Electrician's Friend, published at Tokyo, twice a month.
Electrical News, published three times a week at Osaka.
Proceedings of Central Electrical Association.

STATISTICS ON THE ELECTRICAL INDUSTRY IN CHOSEN

At the end of March, 1918, the electrical companies in Kobe numbered twenty-one. The twenty-one companies consisted of nineteen power and light companies, including two under construction, and two railway, power and light companies.

The total engineering power for electric railway and power companies was 8023 kw., to which may be added 110 kw. in plants under construction. The number of power plants was eighteen and showed an average of 446 kw. per plant.

The total length of line of electric railways was 27.1 miles, or reduced to single track, 36.2 miles. The number of cars was 108, of which 95 were motor-cars, 11 tenders, and 2 watering cars.

The number of electric light consumers was 40,701, the number of lamps 152,028, and the total candle-power 1,806,279. Compared with the end of August, 1917, there was an increase of 18,417 lamps, or 9.6 per cent, and of 153,417 candle-power, or 9.3 per cent.

In the electric power field the total number of consumers showed 297, number of motors 329, and total hp. 2744.

The total capital for electric power, light and railway companies amounted to 14,940,000 yen, and the average dividend was 9.0 per cent per annum.

EXCHANGE PROFESSORSHIPS BETWEEN UNITED STATES AND CHILE

Ratification by the government of Chile and the University of Chile of plans for the exchange of professors and instructors between the United States and the South American republic formulated by the University of California on Hispanic Relations has been effected by official decree of the government of Chile through its minister of public instruction, Pablo Ramirez. An appropriation of $12,000 for the coming year had been provided under the decree signed by President Sanfuentes of Chile.

Chile's official ratification of the exchange professor project marks the first definite result of plans of the late Professor H. Morse Stephens whereby the University of California was to become a center for exchanges of professors and students with the leading Hispanic countries of the world, and for the study of the history and contemporary problems of Spain and Portugal, and more particularly of the Hispanic republics in the two continents of the Americas.

A committee of distinguished educators from the Chilean republic, headed by Dr. Don Pedro Aguirre, arrived in Berkeley early in January of this year and proposed a series of permanent exchanges not only of professors of universities, but also of teachers of high schools and technical schools, including women as well as men. Senor Aguirre's committee further proposed to make use of the University of California as a clearing house whereby the university authorities should arrange for all exchanges in this country.

The exchanges are by no means to be limted to professors of the Unversity of California or even to teachers in the schools of the state. An earnest effort will be made in every case to select the candidates who will best serve the purposes of the exchange.

FOR ELECTRICAL ENGINEERS

The United States Civil Service Commission announces open competitive examinations for the positions of electrical engineer and assistant electrical engineer, for men only. Vacancies in the Signal Service at Large, Washington, D. C., and in positions requiring similar qualifications, will be filled from these examinations, unless it is found in the interest of the service to fill any vacancy by reinstatement, transfer, or promotion.

Certification to fill the higher-salaried positions will be made from those attaining the highest percentages in the examinations.

The duties of these positions comprise the development and design of electrical equipment and especially Signal Corps storage batteries, or the administration of commercial telephone systems and installations of government-owned systems.

Competitors will not be required to report for examination at any place, but will be rated on the following subjects, which will have the weights indicated:

1. Education, training, and experience	60
2. Publications, reports, or thesis (to be filed with application)	40
Total	100

NEW INSTALLATIONS IN NEBRASKA

The Municipal Light and Water Company of Lincoln, Nebraska, is doubling the capacity of one of its pumping plants at 17th and Van Dorn streets. A second unit similar to the one which has been in operation for two years is being installed. It consists of an Allis-Chalmers 500 hp. Diesel engine, and 325 kw. generator.

GROWTH OF TRADE IN CHILE

The following figures are given concerning the imports and exports of the Republic of Chile for the years 1913 and 1918:

	Imports	Exports	Trade Balance
1913	$118,626,411	$140,845,390	+$22,218,979
1918	143,280,000	259,680,000	+116,400,000

The year 1913 witnessed several important developments in the industries of Chile. The first shipyards were built, the meat packing industry was established and an extensive development of coal, iron and copper deposits took place.

AMERICAN-RUSSIAN TRADE IN 1918

The total trade between the United States and Russia fell off to $28,000,000 in the calendar year 1918, as against $438,000,000 in the preceding year. Imports from European Russia in 1918 ($7,000,000) were more than half of the 1917 figures ($12,000,000), and imports from Asiatic Russia showed an actual increase from $2,200,000 to $4,000,000, due to the $2,000,000 worth of platinum recorded in 1918. The great decrease in the total was principally in the export trade, which amounted to only $9,000,000 to European Russia and $8,500,000 to Asiatic Russia, a decline of 97 per cent and 93 per cent, respectively.

The following table shows the imports into the United States from European and Asiatic Russia and the exports from the United States to European and Asiatic Russia for the last six calendar years:

Imports and Exports	1914	1915	1916	1917	1918
Imports from—					
European Russia	$12,306,334	$2,433,222	$4,478,990	$12,350,179	$6,784,603
Asiatic Russia	2,263,063	653,373	4,139,705	2,164,252	3,975,404
Total imports,	14,569,397	3,086,595	8,618,695	14,514,431	10,760,007
Exports to—					
European Russia	22,260,062	125,794,954	309,806,581	315,250,020	8,902,449
Asiatic Russia	5,696,275	44,436,875	160,701,673	109,260,439	8,433,069
Total exports,	27,956,337	170,231,829	470,508,254	424,510,459	17,335,518
Total trade,	42,525,734	173,318,424	479,126,949	439,024,890	28,095,525

NEW TELEPHONE SYSTEM FOR REPUBLIC OF CZECHOSLOVAKIA

The Republic of Czechoslokavia (comprising Bohemia, Moravia, Silesia, and Slovakia) plans to remodel, enlarge, and reequip its telephone system. For this purpose a mission consisting of representatives of the Department of Post, Telephone, and Telegraph, and experienced engineers will be sent to the United States to study and report on the various systems, switchboards, apparatus, appliances, etc., and recommend what in their opinion would best suit the conditions in the new republic.

The United States with its network of telephones is recognized as positively the best field for such research, the ultimate object of which is to place contracts for a complete and thorough telephone system, providing service not only for the territory of the republic, but also taking care of its needs as the leading country of central Europe, through which runs the great trunk line of railway connecting Hamburg, Prague, Vienna, and Trieste, and where important development of

waterways and railways is destined to take place in uniting the North Sea countries with South Poland and the Ukraina, the upper Elbe (Labe) and Oder (Odra) with the Danube, and Czechoslovakia with Hungary, Roumania, and Jugoslavia.

LE CONTE MEMORIAL LECTURES

The series of scientific lectures given in the Yosemite under the University of California Extension Division proved a pronounced success. The public interest in the course was manifested by the size of the audiences. The average attendance at the lectures was about 275 people, with the exception of Dr. Bade's address on "John Muir's Services to the Nation," which was heard by fully 1500 people.

The lectures, which are to be given each year, are known as the Le Conte Memorial Lectures, instituted in honor of the naturalist and geologist, Joseph Le Conte, who for thirty years was a member of the faculty of the University. The speakers are all men of recognized standing in their various fields. Each gave a series of three lectures, making twelve in all.

It is planned to publish the lectures in suitable form for circulation throughout the state and country, helping thus to make more widely known the varied attractions of one of California's most precious scenic possessions, Yosemite National Park.

FOREIGN DEMAND FOR MATERIALS

Many of the public works in the Dutch East Indies, which were suspended during the war, owing to the scarcity of materials, are being resumed, and a demand is developing for plant equipment and materials for waterworks, electric and railway undertakings, and harbor improvements.

WATER POWER SITUATION

With demands of industries and public utilities in northern and central California upon hydroelectric power 5 per cent greater than at this time last year, and streams lower than in July, 1918, the immediate future is regarded with concern by power users. An encouraging feature of the situation is the volume of water in the storage reservoirs, which is greater than in July, 1918. But this increased volume, if called upon, authorities say, is not sufficient to take care of the increasing consumption of power and therefore early and abundant rains must arrive to relieve what may develop into an emergency. Reservoir supplies are being drawn upon at the present time.

Charts kept in the offices of H. G. Butler, power administrator in the Railroad Commission, show the daily condition of the reservoirs, the hydroelectric "load" in the northern and central districts and correlated facts. The present markings on these charts confirm the anxiety of power users.

Demands upon hydroelectric power are greatest during May, June, July and August. Almost all water impounded has to do double duty, for irrigation as well as power usage. In September, irrigation needs drop off, but in late October or early November the lighting loads are present.

The interconnection with the California-Oregon Power Company, which brings in about 7000 hp. from the northern part of the state and Oregon, and which was completed about January 1, and a new steam turbine of about 20,000 hp. capacity being installed by the Pacific Gas & Electric Company, which will be ready for operation about the middle of August, are the only additional sources of power to meet the increased load.

POSTAGE TO AUSTRALIA

Several organizations in Australia have informed the Foreign Trade Department of the San Francisco Chamber of Commerce that the failure of merchants to place the proper amount of postage on letters and circulars is causing irritation which may lead to a loss of business unless it is corrected.

The Foreign Trade Department urges that all mail be fully prepaid. The rate on first class matter is 5 cents for the first ounce and 3 cents for each additional ounce, or fraction of an ounce. The rate on other matter is the same as in the United States.

SAN DIEGO AS AN AIRCRAFT CENTER

Congress has appropriated $6,000,000 for a Naval Aircraft Experiment Station and it is believed that San Diego will be the chosen location for the new station. This, in connection with the North Island Naval Air Station now located near San Diego, would make it a center of aeronautical activities in the United States.

WAR LOAN ORGANIZATION

All the war financing organizations of the Twelfth Federal Reserve district have been consolidated by Governor John U. Calkins of the San Francisco Federal Reserve bank into the War Loan Organization of the Twelfth Federal Reserve district with Robert E. Smith, president of the Title and Trust Company of Portland, as director and C. A. Farnsworth, Twelfth District Liberty Loan Publicity Manager, as associate director.

The War Loan organization will direct closing up of the business of the Liberty Loan organization and also look after the sales of certificates of indebtedness and War Savings certificates and stamps. Particular attention will be given to the sale of the new Treasury Savings Certificates recently issued by the U. S. Treasury Department. They are in denominations of $100 and $1000 and the interest is compounded quarterly as with the War Savings stamps.

Director Smith made a spectacular distribution of the Treasury Savings Certificates throughout the Twelfth District. Hurrying from the Federal Reserve bank by auto and ferry to the aeroplane field back of Berkeley, Smith took the passenger's seat in a De Haviland bomber from Mather Field, Sacramento, with Lieutenant E. E. Neubig as pilot. A record-breaking flight was made to Portland. From there Smith raced down the Willamette and Columbia rivers to Kalama in a motor boat, proceeding by auto to Seattle in time to hand a bundle of the Treasury Savings Certificates to the captain of a fast mail steamer about to sail for Alaska.

TRADE NOTES

New Agency —

The Roller-Smith Company, 233 Broadway, New York City, announces that it has made an agency arrangement with Mr. L. B. Gottschall, 211 No. St. Paul street, Dallas, Texas. Mr. Gottschall will handle the Roller-Smith Company's lines of instruments, meters and circuit breakers in the State of Texas, with the exception of a small portion in the western part of the state. He has had an extensive experience in the sale and installation of electrical apparatus in his locality and his technical ability and wide acquaintance with the trade place him in an excellent position to handle the Roller-Smith Company's rather complex lines.

Change of Address —

Keeler, White & Company, electrical manufacturers' agents at San Francisco, have moved to 509 Mission street, where they have twice the floor space of their former offices and warehouse.

New Sales Manager —

H. R. Basford of 431 Sutter street, San Francisco, announces that A. S. Kedzie, formerly of the Creighton Morris Company of Oakland, California, has joined the Basford forces as sales manager of the vacuum cleaner, ironing machine and washing machine department. Mr. Kedzie has made a specialty of household devices for many years.

Removal Notice —

The Magnavox Company of San Francisco will move their advertising department to 2735 East 14th street, Oakland. The factory will also be on the Oakland side, though the San Francisco office will be retained.

LATEST IN EVERYTHING ELECTRICAL

(An ingenious current-saving device appears in the form of a door-bolt switch which prevents light from being run in an unoccupied and closed room. Other items presented in this review are a plural socket plug, an improved candle socket, a volt-ammeter and a three heat electric iron.—The Editor.)

THE PLURAL SOCKET PLUG

The Ajax Plural Socket Plug was designed to meet the need for a one piece two way plug socket and made primarily for the use of a lamp and an appliance. The old type cluster plugs were originally intended to accomodate two lamps instead of one, as at the time these were placed on the market, lamp efficiency had not been brought to its present high state, and unit lamps of high efficiency were an unknown quantity.

The plural socket plug allows an appliance to be connected without changing the position of the lamp.

Today if a user needs more light with a single socket, he simply uses a higher efficiency lamp and not two lamps as formerly was necessary. Therefore the need of a two way or plural socket plug is to accommodate one lamp and an appliance such as fan, portable lamp, iron, grill, washing machine, vacuum cleaner, etc. And with only such need the user obviously wishes to continue using his lamp in the position originally intended on his fixture. The Ajax Plural Socket Plug, manufactured by the Ajax Electric Specialty Company of St. Louis, accomplishes this primary requirement. It is made in one piece, eliminating the chances of poor contacts, special terminals and loss of parts.

Special features of the device are: One piece "Bakelite" insulation—a heat resisting composition of highest efficiency, allowing use of any style of standard lamps in either socket without affecting the composition. Bakelite is of great density and cannot be broken by ordinary handling.

The main socket remains directly in line with the plug, allowing the lamp to continue in the position originally intended by the fixture. The size of the Ajax plug has been reduced, so that the shade holder ring on the main socket now accommodates an ordinary brass shell socket shade holder.

In the diversified use to which this article is put, every kind and style of plug or standard lamp base must give good contacts in the sockets. These various makes of plugs and lamp bases are not uniform, and to meet this condition a spring center contact has been made in the sockets, ensuring good contacts on all plugs or lamp bases.

AN IMPROVED CANDLE SOCKET

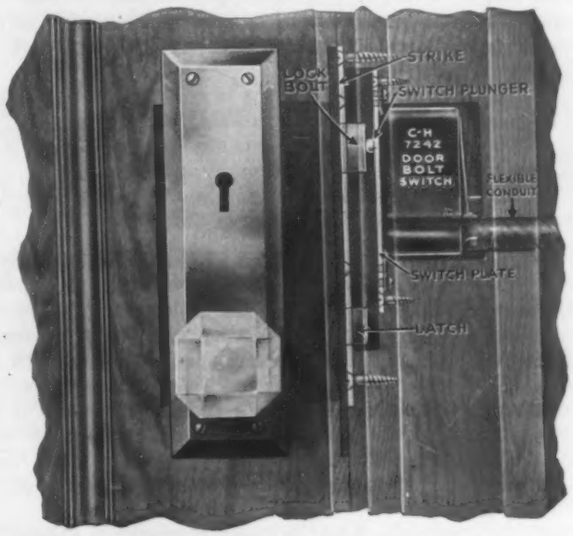
Although candle sockets have contributed not a little to the artistic merits of lighting fixtures, their mechanical construction has left much to be desired by the fixture manufacturer in the way of convenience of installation and wiring. The design of the Bryant Keyless Candle Socket, manufactured by The Bryant Electric Company of Bridgeport, Conn., has been greatly improved in this respect, as will be noted from the accompanying illustration. In wiring candle sockets, as hitherto made by this and other companies, it was necessary to fish the wires through a hole cut in the side of the stem on which the socket was to be mounted, and from this point lead them outside the tubing to the binding posts of the socket. In the improved Bryant socket there is a hole in the center contact of approximately the same diameter as the inside diameter of the tubing which is usually used for making the stems on which to mount the sockets. The socket is dropped over the wires as they protrude from the stem and is screwed in place—this operation being possible without twisting the wires or damaging them in any way.

A candle socket which has special features for facilitating installation and wiring

After the socket has been firmly attached the wires are pulled back by means of a hook or any convenient tool through the open yoke or "hickey" which forms a part of the socket, and are led through the grooves in the porcelain to the binding screw terminals.

NEW DOOR BOLT SWITCH

To prevent the wasteful use of electric light in guest-rooms, hotels and clubs often display in each room a sign reading, "Please turn out the lights when leaving the room." The new C-H Door Bolt Switch which has been developed by the Wiring Device Department of the Cutler-Hammer Manufacturing Company accomplishes what the signs aim to do.



This door-bolt switch prevents waste of current by automatically turning off the light whenever the door is locked from the outside. The phantom view in the above cut shows the C-H Door Bolt Switch mounted in the door jamb with wood screws. They can also be mounted on the strike by using spacers and machine screws furnished with the strike without the spacers, two holes being tapped in the switch plate for the screws.

When the occupant of a room leaves and locks the door from the corridor side, this switch is operated by the lock bolt, the lights within the room are cut off, and the wall switch made inoperative. When the door is unlocked the wall switch may be used to control the lights. This new Door Bolt Switch, although similar in shade to the well known C-H Door Switches, is operated by the lock bolt of a two-bolt lock, such

as is generally used in hotels. They are mortised in the lock side of the door jamb in back of either a flat or box strike, and are connected in series with the regular wall switch which controls the lights within the room. As it is customary to install the regular wall switch conveniently near the door, very little additional wiring is necessary for the installation of the Door Bolt Switch. The accompanying illustration shows the details of this new device and how the movement of the lock bolt will push against the switch plunger and thus open the switch. Being purely a mechanical device, its life should be as long or longer than the ordinary wall switch. Since it works with the locking of the door the reader will readily appreciate that its regular use is practically automatic and that it will be instrumental in the saving of much lighting current to the hotel manager.

A VOLT-AMMETER

A convenient volt-ammeter for quick and accurate testing of lighting and starting systems has been designed by the Roller-Smith Company of 233 Broadway, New York. This instrument, known as the "Handy" type, measures 4 by 5 by

This ammeter, measuring 4 by 5 inches, weighs 20 oz. and is especially designed to meet the needs of linemen, testers and others who require a compact instrument of special accuracy.

2 in. and weighs 20 oz. The mechanism is an efficient permanent magnet of the moving coil type; the scale is hand calibrated, and the base is of special close-grained wood so that the instrument may be laid on a battery without short circuiting it.

The case is of drawn brass heavily enameled in black. The binding posts have non-removable tops.

The entire mechanism is mounted on one base, thus insuring correct alignment of all parts at all times.

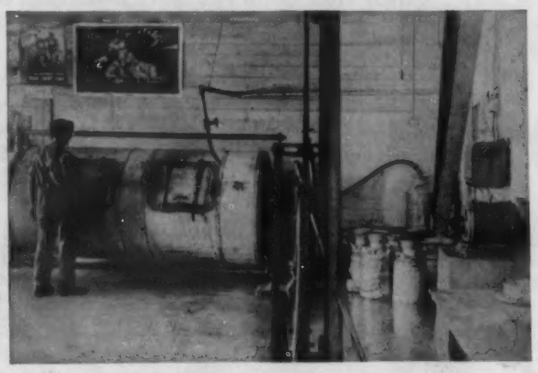
The volt-ammeters read amperes normally, a button being pressed to give the reading of the volts.

THE CENTRAL STATION AND THE RURAL DISTRICT

The last two years have been very prosperous ones for the farmers, especially through the Middle West. Money is plentiful, and the growing familiarity with power apparatus, through the general use of tractors and gasoline engines, has created a demand for more power. The gasoline engine has, so to speak, whetted the farmer's appetite for more; it has shown him what the possibilities are, and at the same time its limitations and the bother it gives him have made him a live prospect for the convenient and reliable power of the electric line.

The Cambridge Light & Power Company of Cambridge, Wis., has built a transmission line 14 miles long from a near-by substation. The line serves a large number of farmers, each of whom pays for his own transformer and protective apparatus. These are all of Westinghouse make and range from 1 to 5 kva. The farm load, in addition to lights in house and buildings and yard generally includes a water pump automatically controlled delivering into a pressure tank for house use; a feed grinder and a washing machine. In some cases a single 3 hp. Westinghouse motor drives a line shaft to which are belted a pump, washing machine, churn, and separator. Farmers are good customers for appliances and practically every home has an electric iron and table ware or vacuum cleaner.

In Cambridge, a town of about 1000 population, the Cambridge Light & Power Company has two 25 kva. transformers serving about 130 lighting consumers, as well as a grist mill, a creamery, a garage, and the pumping plant. In



A Westinghouse motor operating in a creamery. Electricity is coming to be used extensively in all departments of farm work.

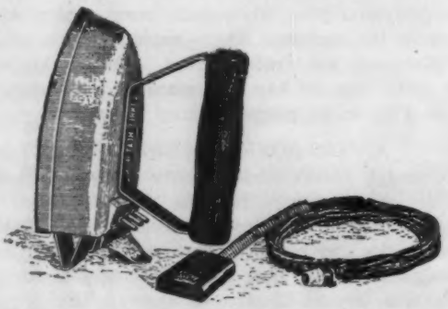
the creamery is a 7½ hp. Westinghouse motor driving a separator, churn, deep-well pump and cream pump. It displaces a steam engine, and the owner says that even though he must keep his boiler in service for sterilizing and water-heating, he finds the motor a paying investment in convenience. In the garage is a 5 hp. motor driving various machines, and in the pumping plant is a 10 hp. motor supplying water to the town.

So far the company has shut down two low-voltage gasoline-electric sets, and in the near future expects to shut down five more. These plants are consirered "trail breakers" for central station service; they are not powerful enough for the heavier farm service, and when central station power is available, the private plant is out of the running.

The prosperous farmers of the vicinity are very anxious to have electric service and the company has no difficulty in adding to its load as fast as it can build the lines.

A THREE-HEAT ELECTRIC IRON

An electric iron which can be regulated to give three different degrees of heat has been put on the market by the Redtop Electric Company, Inc., of New York. The regulation is accomplished by the particular plug combination shown in the illustration. The three heats are plainly marked and



An electric iron which can be regulated to give three different heats

numbered on the plug—3. High Heat, 2. Medium Heat, 1. Low Heat—and it is only necessary to place the plug so that the number on it representing the desired heat is over the corresponding number plainly marked on the iron. The heating area covers the entire bottom of the iron, thereby ensuring the maximum heating surface at the minimum cost of operation. The weight of the iron is 6½ lbs.; a six-foot cord, a heat regulating plug and a stand or heel accompany each one.

Books and Bulletins

Electric Power Transmission

by Alfred Still, Professor of Electrical Design, Purdue University, Fellow A I. E. E., Member Inst. of Civil Engineers; 407 pp.; size 9½ by 6¼ in. Published by the McGraw-Hill Book Company, Inc., New York, and on sale at the Technical Book Shop, San Francisco. Price $3.50.

Although treating mainly of the fundamental principles and scientific laws which determine the correct design of overhead electric transmission lines, the book is intended primarily to meet the needs of the practical engineer. Higher mathematics have been avoided, and a special effort has been made to explain as simply as possible the derivation of practical methods and formulas. For the solution of alternating-current problems vector diagrams and trigonometrical formulas have been freely introduced with a view to providing a suitable text book for engineering students specializing in power generation and transmission, and desiring a work which includes practical application of electrical engineering theory.

The treatment is largely from the standpoint of the engineer who is entrusted with the work of making calculations and drawing up the necessary specifications for a wood pole and steel tower line, respectively.

Talks on Talking

By Grenville Kleiser, formerly Instructor in Public Speaking at Yale Divinity School. 150 pages; size 7½ by 5 in. Published by Funk & Wagnalls Company, New York and London.

This handy little volume comprises nine brief chapters written in a direct and interesting style and strictly to the point. "The tedious talker is one without terminal facilities," says the author—and lives up to his dictum. Arbitrary rules are avoided—with the exception of an illuminating chapter on don'ts for public speakers which includes such admonitary gems as, "Don't rise on your toes" and "Don't 'point with pride.'" Preachers and salesmen are each accorded a special chapter; for the rest the volume handles the fundamental principles of making talks effective and is arranged in such a way that the material is easily accessible as a practical guide when needed, supplying innumerable valuable hints.

Water Wheels

An extremely well-arranged and pleasing booklet has been issued by the Pelton Water Wheel Company of San Francisco. It is printed on heavy glazed paper, with light blue cover, and contains a large number of exceptionally attractive illustrations. The first few pages give data on the water supply for Pelton water wheels, methods of weir construction and measurement, a table for weir measurement, a useful collection of general hydraulic information, and data required for estimates in hydraulic work. Following are descriptions and illustrations of the various types of Pelton water wheels together with valuable technical data in connection with water-wheel use.

Bureau of Standards

"New Forms of Instruments for Showing the Presence and Amount of Combustible Gas in the Air" is the title of a paper by E. R. Weaver and E. E. Weibel issued as Scientific Paper No. 334 by the Bureau of Standards. The authors are Associate Chemist and Associate Physicist, respectively, with the Bureau. Their paper contains a description of experimental work upon the combustion of gas at the surface of an electrically heated wire and the application of this phenomenon to the design of instruments for detecting the presence or indicating the amount of combustible gas in the air. Copies of the paper may be obtained from the Bureau of Standards on request.

California Industries and Land Show

An illustrated booklet has been issued describing the plans for the California Industries and Land Show to be held at the Exposition Auditorium, San Francisco, October 4th to 19th. There will be an elaborate electrical display, with Frank Fagan, illuminating expert for the Edison Lamp Works of the General Electric Company, Oakland, in charge. Mr. Fagan is chairman of the Land Show Committee.

Electrical Precipitation

An attractive circular describing the Westinghouse achievements in the field of electrical precipitation has just recently been issued. The process applies to copper, lead or zinc smelters, blast furnaces, chemical, acid and cement plants for the recovery of valuable material otherwise wasted. Water can be precipitated from oil, dust removed from ventilating systems, etc. It is also applicable to operations such as round houses, which by their smoke or fumes are a nuisance to the surrounding territory.

The necessary apparatus for the Precipitation Process such as motor-generators, transformers, rectifiers, motors, switchboard and accessories are shown installed, and are described in detail in this circular, which is well printed, and illustrated with effective photographs.

Cutler-Hammer Stickers

Among other publicity work on the C-H Seven Fifty Switch, The Cutler-Hammer Manufacturing Company has prepared eight effective two-color stickers which will be used on the outgoing mail from the company's home and eight district offices, and will be furnished to dealers, contractors, jobbers and central stations, for use on letters, envelopes, folders, packages, and similar material. Four of the stickers have been prepared especially for the jobber and others who do not come in direct contact with the consumer, while the other four are especially for the dealer. They direct the customers to bring their appliance cords to the dealer to have them equipped with C-H Seventy Fifty Switches—thus following the trend of all the national and direct advertising being done on this safety switch.

Railways in China

The Ministry of Communications of the Republic of China has issued a report giving statistics of government railways for the year ending December 31, 1916. In addition to tables and discussion the report includes a number of maps and charts showing density of traffic operating expenses, and so forth.

Bureau of Mines

The Bureau of Mines issues as Technical Papers 212 and 216 respectively "The Determination of Combustible Matter in Silicate and Carbonate Rocks" by A. C. Fieldner, W. A. Selvig and G. B. Taylor; and "Vitiation of Garage Air by Automobile Exhaust Gases" by G. A. Burrell and A. W. Gauger.

Bulletin 178 C of the Bureau is by Van H. Manning—"Petroleum Investigation and Production of Helium." This is an advance chapter from Bulletin 178, "War Work of the Bureau of Mines."

The monthly statement of the Coal Mine Fatalities in the United States, compiled by Albert H. Fay, has been issued by the Bureau of Mines for the month of April, 1919.

"The Preparation of Manganese Ore," by W. R. Crane, is a paper recently published by the Bureau of Mines as No. 17 of the Minerals Investigation Series.

Bulletin 168 of the Bureau of Mines is the work of Dorsey A. Lyon and Oliver C. Ralston, and is entitled "Recovery of Zinc from Low-Grade and Complex Ores." As one of the Petroleum Technology Series the Bureau publishes Bulletin 176—"Recent Developments in the Absorption Process for Recovering Gasoline from Natural Gas," by W. P. Dykema.

NEW ELECTRICAL DEVELOPMENTS

(Extensive irrigation developments are features of the Northwest news for the past two weeks. The Hetch Hetchy project is in the foreground in Pacific Central activities and the Southwest reports the coming erection of several large plants. Developments in the Inter-Mountain district comprise a little of everything, from street-lighting to irrigation.—The Editor.)

THE PACIFIC NORTHWEST

PASCO, WASH.—The Pasco-Page Telephone Company has been incorporated here.

SEATTLE, WASH.—A large quantity of electrical equipment will be required in connection with the construction of the proposed 18,000,000-ton dry dock at the plant of the Ames Shipbuilding & Dry Dock Company, including complete electrically operated pumping apparatus, motors, etc.

OLYMPIA, WASH.—Present valuation of the Pacific Power and Light Company properties serving Yakima, Walla Walla, Goldendale and White Salmon geographical divisions in eastern Washington has been fixed by the public service commission at $6,207,532, preliminary to granting an increase of rates.

SEATTLE, WASH.—Legislation has been set in motion to obtain congressional aid for the big reclamation project in Kittitas county, Washington. Representative Summers introduced a bill to appropriate $7,000,000 for expenditure on the Kittitas high line unit, which is to be an extension of the Yakima project.

VANCOUVER, WASH. — The question of draining Vancouver Lake assumed a trifle larger proportions when it was learned that the City Port Commission intends to investigate their interests in the affair. It appears that a recent session of the state legislature gave the lake to the Port Commission for the purpose of creating, some time in the future, a deep water harbor for Vancouver.

PENDLETON, ORE.—Despite the fact that it was impossible to obtain official assurance of the approval of the McKay creek dam project at this time because of lack of funds for any irrigation extension until the Lane bill or some other similar measure is passed by Congress, E. P. Dodd, who went to Washington as the representative of this district in the matter, returned feeling that, as soon as funds are available, the project will be among the first to receive attention.

KLAMATH FALLS, ORE.—That the lands on the eastern side of upper Langell valley will be formally added to the Langell valley irrigation project at the regular meeting of the board of directors on August 5 is now generally expected, as all of the preliminary arrangements for this move have been made. This addition will bring the total of the proposed irrigated area up to approximately 30,000 acres and nearly double the amount of land now covered by the United States reclamation service here.

SALEM, ORE.—John H. Lewis, engineer-manager of the Warm Springs irrigation project, arrived in Salem recently to confer with members of the irrigation securities commission. The project recently asked certification of bonds in the sum of $600,000 in addition to $750,000 in bonds previously certified. The project contains approximately 39,000 acres, 29,000 of which are subject to irrigation. Mr. Lewis was formerly state engineer and is well versed in irrigation matters.

SALEM, ORE.—The state irrigation securities commission has received an application from the Talent irrigation district in Jackson county for certification of bonds in the sum of $45,000. Money derived from the bonds will be used in new work. The district includes about 8000 acres and $175,000 in bonds already have been approved. The Squaw Creek irrigation district in Deschutes county has asked certification of an issue of $15,000 for new work. This district has 8000 acres, with bonds in the sum of $98,000 already issued.

KLAMATH FALLS, ORE. — Modification of the contract between the California-Oregon Power Company and the government, by the terms of which the former threatens to reduce the water level of upper Klamath Lake, is asked in a telegram to Secretary of the Interior Franklin K. Lane, sent by the timber interests, mill owners and others interested in timber or its manufacture in this section. It is pointed out that those signing the telegram have made heavy investments tributary to the lake, in mills, box factories and log canals, relying upon the natural condition of the lake.

BEND, ORE.—In preparation for the starting of immediate construction of a 1500 hp. unit on Tumalo creek, in case the agreement already approved by the state for power rights is endorsed by eastern officials of the company, preliminary work has been started by the Bend Water, Light & Power Company. A second unit of like capacity is planned, to be erected as need arises. According to surveys already made, a 4000-ft. line of 40-inch pipe will carry water from the Columbia Southern ditch, returning the water from the power unit to the creek. Power will be brought to Bend over an eight-mile transmission line. It is possible that another line may be built to include farmers of Tumalo and Deschutes among the electric light users of the county.

THE PACIFIC CENTRAL DISTRICT

BAKERSFIELD, CAL.—The Kern county supervisors have called a $40,000 water system bond election in the Oildale district for Aug. 5.

PASO ROBLES, CAL.—Daniel Fisher of San Jose has purchased 2000 acres of the Bolton estate and is planning an irrigation system by wells.

PITTSBURGH, CAL.—Several bonding propositions are to be submitted to the people in the near future. Among these will be the installation of an electrolier lighting system.

LIVINGSTON, CAL.—A petition was presented to the Board of Supervisors of Merced county at their meeting on August 4th, asking for the organization of an irrigation district.

OAKDALE, CAL.—Plans are being prepared by the Calaveras Copper Company for a reservoir and power plant to supply electricity for their plant at Copperopolis, according to notice received by the Oakdale Irrigation District from the State Water Commission.

ANTIOCH, CAL.—The water supply is low and is liable to become worse from season to season as irrigation becomes more extensive at points above Antioch. Only one course appears to be open, and that is to try the experiment of sinking wells with a view to tiding over the low water period.

MARTINEZ, CAL.—Plans and specifications are being considered by the Contra Costa Gas Company for the construction of a modern dwelling house on their property at the corner of Melrose and Estudillo streets and the erection of a large gas storage tank. It is understood that the investment of the company here will exceed $10,000.

OROVILLE, CAL.—Reports on both the Oroville-Wyandotte and Honcut-Yuba irrigation districts will be made by the state engineer at the same time, and when they are ready the board of supervisors will call a special meeting for the purpose of fixing dates for the elections in the two proposed districts. A representative of the state engineer's office is expected in Butte county within a few days.

SACRAMENTO, CAL. — Oregon hydroelectric lines, connecting with California lines, are relieving the shortage of power in this state, which is greater than ever before, owing to unprecedented low water in all the streams. In addition it is reported that every steam power plant in the state is running to meet extra demands. Electricity is being generated from steam by the Pacific Gas & Electric Company.

MODESTO, CAL.—Bonds amounting to $600,000, to provide funds for the construction of an electrical power plant, will be voted on separately on the same ballot with the Don Pedro reservoir project, according to a resolution adopted jointly by the Modesto and Turlock irrigation district directors. The proposition as outlined would result in the construction of a power plant with a capacity of 40,000 horsepower and sufficient to take care of the full capacity of the proposed Don Pedro dam.

MARYSVILLE, CAL.—F. L. Fehren of San Jose, who recently was denied a petition for creating an irrigation district by the board of supervisors of Yuba county, with the privilege of taking water from the Yuba river in this county, has made application to the state engineering department for 500 feet per second of waters of the Yuba and Feather rivers to irrigate 50,000 acres of land in Yuba county. The main canal which Fehren proposes to build will be forty miles long, the application states.

MARYSVILLE, CAL.—Competition with the Pacific Gas & Electric Company and the Great Western Power Company in furnishing electricity to Marysville, Sacramento and other valley towns is planned by the Marysville and Nevada Power and Water Company. Immediate construction of the first unit of the proposition is to commence at Bullard's Bar, near here. The contract for building the dam has been let to a San Francisco firm. The firm dam will be 40 feet high, to be increased next summer to 170 feet. Fifty men will be put to work to build it.

PORTERVILLE, CAL.—The Santa Fe Railroad has purchased from the Visalia Electric Railway branch lines constructed through newly opened citrus territory to connect with the Porterville Northeastern, a Southern Pacific subsidiary. Consummation of this deal, it is said by Santa Fe engineers here, means immediate construction of the proposed Porterville-Ducor branch of the Santa Fe, the leasing of trackage from the Southern Pacific from Ducor to Oil City, and the future routing of transcontinental traffic by the Porterville branch.

NEVADA CITY, CAL.—The capacity of Lake Van Orden, one of the storage reservoirs of the Pacific Gas & Electric Company, near the summit of the Sierras, is being enlarged by raising the dam an additional five feet. A large crew of men and necessary materials have been assembled, and the work will proceed rapidly. The water of Lake Van Orden is conveyed by canal to Lake Spaulding, fifteen miles to the west, and becomes a part of the great power generating system of the company. An additional unit is being added to the Lake Spaulding dam.

OROVILLE, CAL.—That if an irrigation district is organized in the Thermalito and Table Mountain sections, the Pacific Gas & Electric Company will guarantee to furnish water for at

least 20,000 acres, was the statement made by President John A. Britton of the Pacific Gas & Electric Company, to the Chamber of Commerce. Mr. Britton stated that the rehabilitation of the Thermalito distributing system, of the construction of the Concow impounding dam, and a more careful use of water would enable 20,000 acres to be irrigated in Thermalito and Table Mountain.

SAN FRANCISCO, CAL.—Bids opened by the Board of Public Works for the construction of the Hetch Hetchy dam in the Tuolumne river revealed the Utah Construction Company of Ogden and San Francisco as the low bidder on both types of dam asked for in the specifications. The only other bidder was R. C. Storrie & Co., of San Francisco. The Utah Construction Company offered to build the dam with an overflow spillway and radial gates for $5,369,808.50. The Storrie bid on the same work was $5,431,010, a difference in favor of the Utah of $61,201,50. Upon the alternative bid for the dam with a syphon spillway the Utah company bid $5,446,-792.50, while the Storrie bid was $5,475,910, a difference of $29,117.50 in favor of the Utah company. The contract for the dam was awarded to the Utah Construction Company, and since the announcement there has been a steady sale of the Hetch Hetchy bonds.

REDDING, CAL. — Proposed irrigation projects, which would turn water on thousands of acres of fertile land in northwestern Shasta and Modoc counties, are being investigated by State Engineer W. F. McClure. The state official is accompanied by Secretary-Manager Chase of the Northern California Counties Association. The first project to be viewed will be on the McArthur estate, where it is proposed to irrigate 5000 acres and subdivide the land. Then Mr. McClure will go over into Big Valley to decide on the feasibility of a project which is planned to irrigate 22,000 acres. The inspection trip will end with a trip through Modoc county, the state engineer paying particular attention to Jess Valley, an irrigation project of 40,000 acres. Land owners in this district hope to get state financial cooperation in making the surveys. The High Sage and Crook's Canyon projects of 10,000 acres each also will be brought to the attention of the state engineer.

THE PACIFIC SOUTHWEST

PASADENA, CAL.—The Pacific Electric Company will install heavy girder rails and repave its right-of-way in Colorado street between Broadway and Lake.

LOS ANGELES, CAL.—The city council has called an election in the Westgate District for August 13 to vote on issuing $700,000 bonds for constructing a water distributing trunk line.

IMPERIAL, CAL. — Imperial Irrigation District bonds to defray the expense of construction and maintenance of a water system from Hanlon Heading, to connect with canals of the local water companies, will be voted on soon.

PASADENA, CAL.—Work will begin soon on the construction of High Dam at Devil's Gate. The dam is to be 100 ft. wide at the bottom, tapering up to 80 ft. in width at the top. The structure will be more than 100 ft. high.

VENICE, CAL.—Mayor A. E. Coles has appointed a committee to investigate the proposed centering of the Pacific Electric tracks on the trolleyway. Venice and Santa Monica are anxious to have the tracks centered through both cities.

LOS ANGELES, CAL.—The Public Service Commission has under consideration the feasibility of having aqueduct water carried into about 20,000 acres of land in the Corojo Valley, Ventura county. It is suggested that water now allowed to run down the Santa Clara river during the winter season might be used by being impounded in reservoirs and released in the summer.

PHOENIX, ARIZ.—A resolution has been passed by the Public Service Commission declaring intention to construct a conduit of reinforced cement concrete to take care of the Salt River Valley Canal between the east line of Central avenue and the east line of Third avenue. A 4-inch centrifugal pump is to be erected at Third avenue for lifting water from the canal for irrigation purposes.

LOS ANGELES, CAL. — The new packing plant to be erected at Vernon by the California Provision Company of Los Angeles will consist of a number of buildings, including a boiler plant and refrigerating plant. The cost for equipment has been estimated at about $75,000; the figure for the entire plant at $125,000. The contract has been awarded to Charles B. Harp of Los Angeles.

POMONA, CAL.—Promoters of the irrigation district southwest of San Dimas, in which 20,000 acres will be supplied with water from San Gabriel Canyon, have made formal request to the State Water Commission for the privilege of diverting water from San Gabriel river and Puddingstone Canyon. A reservoir is planned to be built in the bed of Puddingstone Canyon—water to be brought down from San Gabriel river, San Dimas Canyon, etc.

EL CERRITO, CAL.—Voters of El Cerrito have decided against two bond issues totaling $70,000 by failing to give the issues the necessary two-thirds majority to carry them. Proposition No. 1, providing $60,000 bonds for a storm sewer system, lost by a vote of 105 for the bonds and 80 against. Proposition No. 2, for $10,000 for fire-fighting equipment, lost by a vote of 88 for the bonds and 96 against.

LOS ANGELES, CAL. — The Goodyear Tire and Rubber Company of Akron, Ohio, has acquired a site near Los Angeles on which it proposes to erect a new plant. The works will consist of a group of buildings to include every department of operation, as well as an electric power station. The entire cost is estimated at about $4,000,000, and a California corporation will be organized to construct and operate the plant.

LOS ANGELES, CAL.—Wage increases of from 2 to 3 cents an hour, affecting thousands of employes of the Los Angeles Railway Company and the Pacific Electric Company's lines, are announced. High cost of living was given by railway officials as the reason for the increases. Pacific Electric motormen and conductors will be paid from 41 to 49½ cents an hour; freight motormen, 53 cents an hour; brakemen and switchmen, 48 cents; trolleymen, 43 cents, and yard foremen, 53 cents. The Los Angeles Railway Company is paying practically the same scale.

SAN DIEGO, CAL.—Contracts calling for the expenditure of approximately $1,000,000 for the installation of sewer, water and lighting systems and construction of the industrial group of permanent buildings, including administration building, power houses, storage plants and additional barracks at the marine brigade post in Dutch Flats, are expected to be awarded in September. Announcement was made by Com. Norman Smith, public works officer for the Twelfth Naval District, that plans and specifications for the proposed work are now being completed by public works officials.

THE INTER-MOUNTAIN DISTRICT

BRIGHAM CITY, UTAH.—Steel poles for the new street lighting system for this city have arrived and will be immediately put in place.

UNCON, IDA.—The Utah Power & Light Company is extending its distribution system to the eastern part of this town to take care of customers in this section.

PRESTON, IDA.—A certificate of convenience and necessity has been issued by the Idaho Public Utilities Commission, granting the Utah Power & Light Company permission to extend its lines into Franklin county, beyond Preston.

OGDEN, UTAH.—Efforts are being made by merchants and others interested in this city, to induce the Utah-Idaho Central Railroad to build an interurban line from Ogden through West Ogden and thence to West Weber and Plain City.

PRESTON, IDA. — A special election was held in the village of Weston, on the 11th of August, for the purpose of voting upon the issuance of municipal coupon bonds in the amount of $8000, to pay the cost of constructing an electric light and power distributing system.

SALT LAKE CITY, UTAH.—The electrification of the Salt Lake, Garfield & Western Railway Company's line between Salt Lake City and Saltair Beach has finally been completed and the six new electric cars will be put into service, commencing August 3rd. Fifteen-minute service will replace the old schedule of forty-five minute service with this change.

POCATELLO, IDA.—Lightless nights may be inaugurated throughout certain districts of the state of Idaho to permit greater use of electricity for irrigation pumping purposes. A great demand has been made on the Power Company for current to pump water for irrigation on account of the extremely dry season, with resulting tax on the capacity of the various plants.

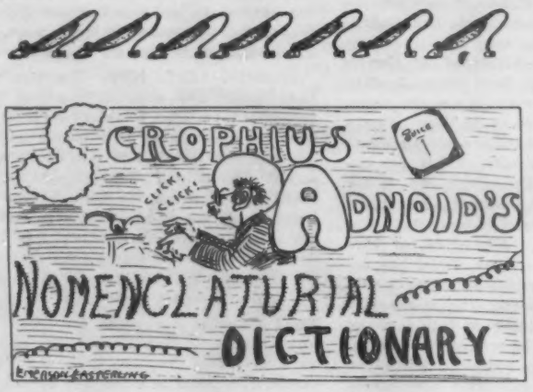
CARSON, CITY, NEV.—The Public Service Commission has granted the Bell Telephone Company permission to extend its lines to Tonopah. The extension will enable residents of Tonopah and Goldfield to talk direct with Reno and San Francisco. The company purposes to string its wires on the poles of the Western Union Telegraph Company, and to connect with the system of the Nevada-California Telephone Company, which has served the people of southern Nevada for several years.

CARSON CITY, NEV.—The irrigation of Eagle Valley is a question that has been seriously considered for some time, and various plans have been proposed. Now that the Upper Carson dam seems in a fair way to be constructed interest has revived and serious thought is given to the matter of including Eagle Valley in the project. State Engineer Scrugham has announced that he and R. Conklin of the department of the interior will make a reconnaissance of the different projects capable of development in the state and the Eagle Valley project will be included in the general survey.

BOISE, IDA.—The installation of a new unit at the Lower Salmon Falls plant of the Idaho Power Company has just been completed and 4000 hp. additional output secured. This capacity will aid materially in providing necessary current for irrigation purposes for which there is an enormous demand this year. The question of interconnecting the system of the Idaho Power Company with that of the Utah Power & Light Company is also being considered by the officials of the two companies and the Public Utilities Commission. Such an interconnection would materially aid the Idaho Power Company in taking care of business in the west end of the territory which it now serves.

LOGAN, UTAH.—The installation of a new ornamental street lighting system for the principal business streets of Logan will take place shortly, according to plans now being perfected by Mayor Bullen and the City Commission. Everything incident to the installation is ready and the contract for actual construction will be let in the very near future. The installation of the new system will mark the end of the old wooden telephone poles which have been on the streets for several years. New and ornamental poles will support the street car trolley wires and the new lines. The new lighting district planned will cover from First South to Third North on Main street, from First West to First East on First North. On Main street two lights will be placed on each pole and on the other streets only one lamp will be on each pole.

CASUAL FACTS ABOUT OURSELF and about you, a bit of poetry written by a mutual acquaintance and a good story if we happen to have one on hand—that is what you will find on this page. Take it for granted you have dropped in for a chat in our office and are being entertained while you wait by the office boy or, as we have personified it here, the office Vacuum Cleaner. You would hear a touch of gossip and then besides, some of the more important items of life which formality excludes from the regular columns of a technical magazine. This rich harvest has been placed in care of our electrical janitor and is here presented for the diversion of an idle moment.—The Editor.



SCROPHIUS ADNOID'S NOMENCLATURIAL DICTIONARY

Ampere—Gallons per minute of juice.
Battery—Juice barn.
Current—Amount of amperes that the voltage shoves along the line.
Direct current—The straight goods in the electrical line; no come-back.
E.M.F—No, it is not a make of automobile. It is the goods.
Farad—The reputation of a condenser.
Ground—Anything from a wet fence post to a person that the juice finds a circuit through back to the source.
High tension—Hot stuff.
I—An algebraic symbol by which the dopers try to figure out just how much it is going to cost Mrs. Ivan Ovalidtch to burn that new toaster of hers for ten minutes per day for seven weeks.
Juice—That's telling.
Kilowatt—What the meter-users worry about.
Laminations—The things the kids use for sailers when a transformer burns out.
Micro-farads—The way you measure the capacity of the condenser that goes onto your medical shocking coil; if you are very nervous you even do some subdividing of the micro-farads.
N—It does not necessarily mean "nothing," but we will let it stand for it this time.
O—The amount the average lineman's brains would total if asked to answer electrical questions in an examination.
Power factor—The stuff that the guy that owns the plant is interested in.
Resistance—The junk that keeps the meter from doing a fandango when a circuit is closed.
Secondary—The opposite of primary.
Theory—That with which the engineers try to bulldoze the public into their way of thinking.
Unit—A lot of things. Sometimes a generator in a power plant.
Variation—The condition that enters into a man's pay check when he lays off.
X-ray—The stuff the doctors burn you up with trying to cure you of some new kind of psychic disease.
Y—This must be a misprint as you see it in any electrical work—perhaps it is not, though.
Z—Probably stands for the time that a man puts in telling the other fellow how he used to raise the dickens when he was on a floating gang.

—EMERSON EASTERLING.

ENGINEERS OF YESTERDAY—15. FRANKLIN

(Series compiled by A. L. Jordan)

During the performance of the famous "kite experiment," where was Franklin?

Safe and dry in the shed pictured above by the artist. The experiment was of such great importance because it was the first proof (1752) of the identity of lightning and the electric spark and led to the invention of the lightning rod.

Benjamin Franklin (1706-1790) was one of the world's great geniuses. Apprenticed to a tallow-chandler, becoming a printer, then a writer, organizing the first police force and fire company in Philadelphia, interesting himself in education, in paving, lighting and building hospitals, organizing the American Philosophical Society, he here became postmaster. The pages of United States history record other public achievements, as his connection with the "Stamp Act," being on the first foreign mission (to England), assisting in drawing up the Declaration of Independence, culminating in appointment as Commissioner to France. He was made a member of most of the important societies of the world, including the Medical Society of London and the Royal Society. His activities in scientific and practical lines were numerous. Among others they were investigations as to the causes of earthquakes and whirlwinds, aeronautics, navigation (water-tight compartments, floating anchors, oil for calming high waves) and clock-making. He invented bifocal eyeglasses, the "Franklin stove" (our hot-air furnaces use the principle) and a remedy for smoking chimneys. He ventured to oppose Newton's theories of light, believing in the existence of ether waves. In his later years we read of his advocating the abolition of slavery. His best known work is his "Autobiography."